PRESYNCHRO
Tutorial/Reference Manual

PRESYNCHRO/TEAPAC

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PRESYNCHRO/TEAPAC
Pre- and Post-processor for SYNCHRO Network Manipulation

PRESYNCHRO is a pre- and post-processor to be used with the SYNCHRO program.

This interactive analysis tool will automatically generate the network structure required by SYNCHRO for the signal system being analyzed. Further, the phasing and timings for each signal are specified in straightforward TEAPAC/HCM-styled traffic engineering terms, and can be changed easily when testing alternatives. After an analysis by SYNCHRO is completed, PRESYNCHRO has the capability of importing any SYNCHRO results and producing easy-to-read signal timing charts with phasing diagrams. This, in combination with the true-HCM capacity analysis output of SIGNAL2000, provides all the information needed to implement the optimum timings in a network.

PRESYNCHRO can Import an entire SYNCHRO network from its UTDF files and share this information immediately with other TEAPAC programs such as SIGNAL2000, PRETSPPD, PREPASSR, PRETRANSYT and PRENETSIM, as well as with VISSIM through its built-in TEAPAC interface, thereby allowing the data inputs to SYNCHRO to be used by any or all of the programs mentioned above for more complete, proven and trusted results in terms of assessment, optimization and animation. Upon completion of the assessment, optimization or animation of the network by these other programs, PRESYNCRHO can export these results back to SYNCHRO for further viewing and/or as a final resting place for the optimized parameters.

Furthermore, PRESYNCHRO has the ability to read SIGNAL2000 data files directly, eliminating the need to enter any data at all if SIGNAL2000 was used to estimate saturation flows and average signal phasings and timings for each signal. Since both of these are required inputs of SYNCHRO, the use of PRESYNCHRO in conjunction with SIGNAL2000 makes a smooth, error-free system for signal timing optimization. PRESYNCHRO can also use data files from PREPASSR, PRETRANSYT, PRETSPPD and PRENETSIM, allowing the interchangeable use of SYNCHRO, PASSER-II, TRANSYT, TSPPD and NETSIM/CORSIM based on the same data base to take advantage of the benefits each program offers.

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The PRESYNCHRO Tutorial/Reference Manual was written by Dennis W. Strong and is presently being enhanced and maintained by Dennis W. Strong of Strong Concepts.

The SYNCHRO program was developed by Trafficware in Albany, California.

This document, the *PRESYNCHRO Tutorial/Reference Manual*, is provided as a part of the license to use PRESYNCHRO/TEAPAC. References in this document are made to other documents which are not included with the PRESYNCHRO program and are available from various sources. In particular, references are made to the *TEAPAC Tutorial/Reference Manual* which is available from Strong Concepts. This document applies generically to all TEAPAC programs and describes the details of and advanced usage procedures for the common interface used by all TEAPAC programs. Reference is also made to the SYNCHRO Manual, available from Trafficware.

Comments on the usefulness and organization of the program and this document are welcome, as continual updates and improvements are being made. Please direct your comments to Strong Concepts.

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CHAPTER 1

Introduction

Chapter 1 Topics

Strong Concepts develops and maintains a package of programs which provides quick, accurate and consistent analysis and design of traffic and transportation-related engineering problems. These programs are known collectively as TEAPAC, an acronym for Traffic Engineering Application PACkage. More than a dozen integrated programs are included in TEAPAC, all of which use the same basic user interface and procedures to direct the actions of the programs. In addition, these programs share the same characteristics with regard to data entry conventions and storage format for data files. This allows convenient and efficient sharing of information between programs.

PRESYNCHRO is one of the programs within the TEAPAC program package. PRESYNCHRO is designed to aid in the use of the SYNCHRO signal network manipulation model. PRESYNCHRO is an interactive preprocessor program which is used to prepare input data for the SYNCHRO model. Besides allowing easy-to-understand free format input, PRESYNCHRO also provides for error checking prior to executing the SYNCHRO model. As a postprocessor for SYNCHRO, it also displays signal timing diagrams that are easy to read for timing implementation in the field, as well as passes data to SIGNAL2000 for true-HCM capacity analysis. Complete SYNCHRO networks can also be imported into PRESYNCHRO for exchange with other TEAPAC programs.

In order to illustrate these features, an initial example for the PRESYNCHRO program has been created. By following the step-by-step instructions contained in Chapter 2 of this manual, you will become familiar with the basic PRESYNCHRO commands and procedures. If unfamiliar with the TEAPAC package in general, review of the tutorial section (Chapters 1-4) of the *TEAPAC Tutorial/Reference Manual* will increase the speed and effectiveness of learning the PRESYNCHRO program.

Chapter 1 Topics

Chapter 1 Introduction
Structure and Organization
Conventions
Review of TEAPAC Procedures

Structure and Organization

This document, the *PRESYNCHRO Tutorial/Reference Manual*, explains the data entries and procedures necessary to use the PRESYNCHRO program. The organization of the *PRESYNCHRO Tutorial/Reference Manual* is similar to all of the TEAPAC manuals. Chapters 1 through 5 serve as the program Tutorial Manual. The tutorial steps through a simple example problem and then discusses the specific analysis techniques and procedures of the PRESYNCHRO program. The attached appendices form the program Reference Manual which provides easy look-up of detail on the program's inputs, operation and output. The following paragraphs briefly describe each section of this manual.

This chapter, Chapter 1, discusses the overall structure of the tutorial/reference manual and the conventions used throughout (see the outline in Table 1-1). It also contains a brief explanation of the basic procedures of TEAPAC which are described in detail in the *TEAPAC Tutorial/Reference Manual*. If you are unfamiliar with the TEAPAC package, you could review the tutorial section of the *TEAPAC Tutorial/Reference Manual* in order to better understand the basic TEAPAC inputs and procedures.

Table 1-1
Organization of the PRESYNCHRO Tutorial

Chapter 1 - INTRODUCTION
- Structure and Organization
- Conventions
- Review of TEAPAC Procedures

Chapter 2 - INITIAL EXAMPLE
- Description of Example Problem
- Data Entry
- Data Review
- Analysis
- Evaluation
- Exiting the Program
- Additional Concerns

Chapter 3 - ANALYSIS PROCEDURES
- Input Requirements
- Analysis Procedures

Chapter 4 - ACTIONS AND ENTRY PARAMETERS
- RESULTS Dialogs
- PARAMETERS Dialogs
- Common TEAPAC Dialogs

Chapter 5 - ADVANCED PROCEDURES
- Sharing Data Files with Other TEAPAC Programs

In order to illustrate the features and basic procedures of PRESYNCHRO, Chapter 2 presents a "hands-on" example problem with detailed step-by-step instructions on how to execute a simple analysis using the PRESYNCHRO program. This chapter provides an opportunity to use the PRESYNCHRO program and observe the results.

Chapter 3 discusses the analysis techniques and procedures which should be used with the PRESYNCHRO program, as illustrated by the example presented in the previous chapter. After reading this section, it should be possible to perform simple analyses using the PRESYNCHRO program.

Chapter 4 provides a summary of each of the action and entry dialogs used by the PRESYNCHRO program, organized by function (details are in Appendix B). This includes a summary of the basic TEAPAC actions and entries which appear in all TEAPAC programs.

More detail on these TEAPAC functions can be found in Appendix B and the *TEAPAC Tutorial/Reference Manual*.

Chapter 5 discusses advanced techniques for using the PRESYNCHRO program which will improve the efficiency of conducting analyses. These techniques require a working familiarity with the basic principles of using both the TEAPAC package and the PRESYNCHRO program, as described in Chapters 1-4.

Attached to this tutorial are eight appendices (A through H) which form the PRESYNCHRO Reference Manual. Each of these appendices is designed to provide quick answers to questions which may arise during the use of PRESYNCHRO. These appendices provide detail on program actions, entries, methods and formulae used in calculating results, program reports, error messages, operating system conventions and addenda. Their contents are each ordered in a manner that is convenient for lookup purposes. The introduction at the front of the appendices briefly describes each appendix and how to use it as a reference document. An index at the end of the entire document is provided for the combined Tutorial/Reference Manual.

Conventions

Due to the interactive nature of the PRESYNCHRO program, the tutorial contains sections which provide "hands-on" program instructions. When reading these sections, it is recommended that each step be executed as shown in the documentation. The information described below will help in understanding the conventions and terms used in this example, as well as the entire document.

Definition of Terms
Intersection Approach and Movement Data Entry
Phasing Sequence Codes
Version Number
Input Modes
Example Data Entries
Parameter Symbols

Definition of Terms

Important terms which are used throughout the documentation are defined in Table 1-2. It is helpful to be familiar with these terms prior to using the tutorial/reference manual.

Table 1-2
Definition of Terms

Program Control Menu. PRESYNCHRO starts up in the Normal View of the Visual Mode by first displaying the Main Menu. From this menu, all program options can be selected and executed, including the Tabular View and the Manual Mode.

Menu Line Item. A Menu Line Item is one of the options displayed in any drop-down menu, or in a lower-level menu. It can be selected and executed to display a dialog box to enter data or execute a function.

Dialog Box. When a Menu Line Item is selected or the ASK command is used, a dialog box is displayed. In this display, data entries can be easily entered and changed, and calculations can be initiated, by simple cursor and/or mouse movements.

Command. A Command is the keyword used to identify a dialog box, and is the first word of an Input Line which identifies the kind of action to be performed by the program. These actions are either to enter data or to perform analyses.

Parameter Values. Parameter Values are data entries found in a dialog box, or which follow a Command on an Input Line. These values define the data being entered or control the analysis to be performed. Most dialog boxes have at least one Parameter Value associated with it.

Default Value. When the program is run initially, all parameter values take on pre-assigned default values. These are reasonably typical values. Default Values can be restored using the File-New menu or the RESET command.

Command Level Prompt. The Command Level Prompt, "→", is displayed in the Manual Mode when ready to accept a Command Input Line from the keyboard.

Input Line. An Input Line consists of a Command keyword and its Parameter Values. An Input Line may be entered in either the Tabular View or Manual Mode, or LOADed from a data file.

Group Name. Groups Names are used to identify sets of commands which share a common function. These commands can be referenced together as a group by using the Group Name enclosed in square brackets, e.g. [BASIC].

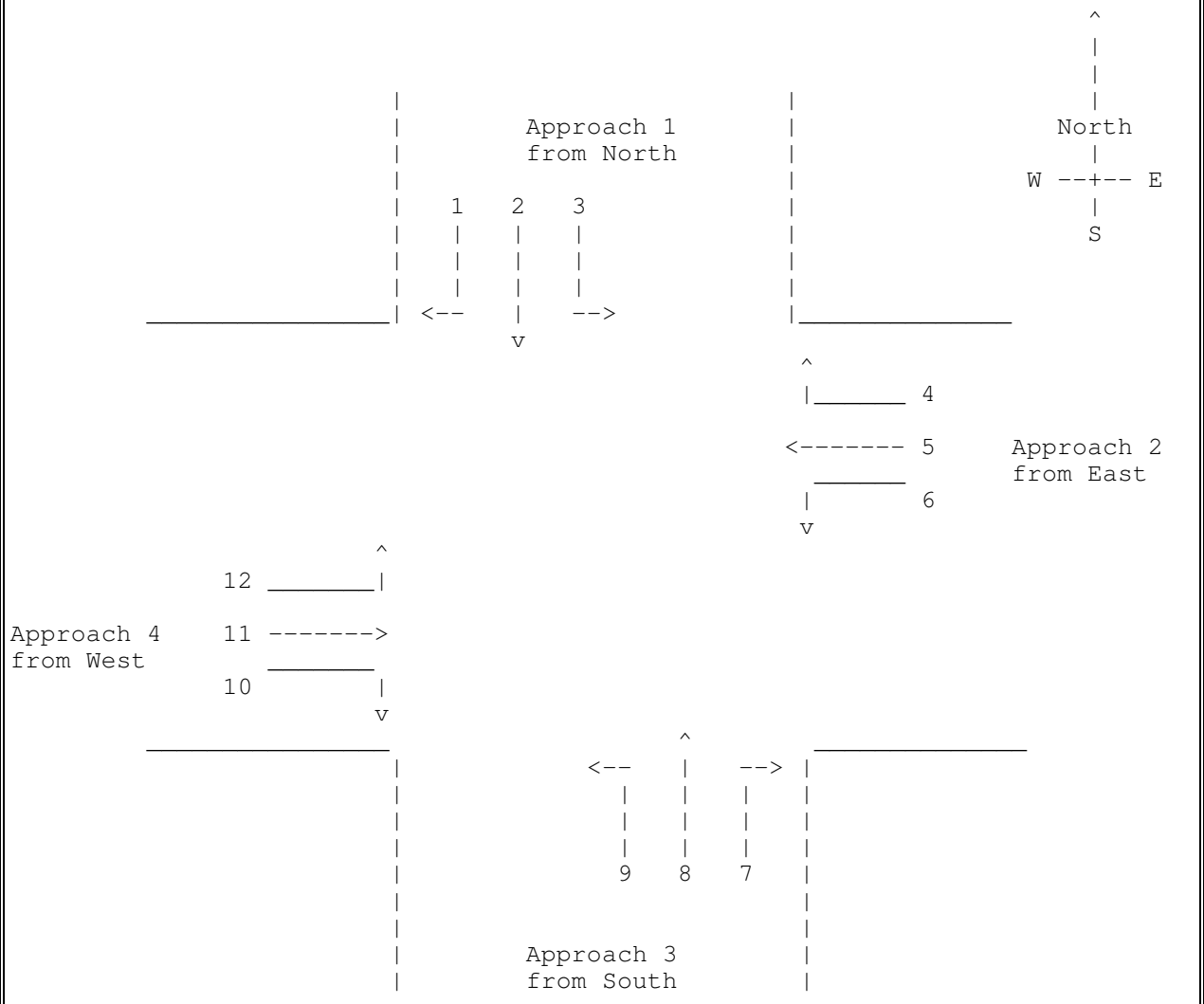
File. A file is a place on a permanent storage disk where program entry information is stored. This information can be either input data information (a data file), commands to direct computations (a control file), or a combination of both.

Intersection Approach and Movement Data Entry

TEAPAC programs enter intersection approach and movement data in a standard order, starting from the north and moving clockwise around the intersection. These conventions should be understood when entering intersection data, as described below and as illustrated in Figure 1-1.

Approach Data - When approach information is required and four parameter values are to be entered, one for each approach, data will be entered starting with the north approach followed by the east, south and west approaches (approach numbers 1, 2, 3, and 4). When data is required for a specific approach, the approach should be specified using the cardinal direction codes North, East, South, and West, meaning from the North, from the East, etc.

Turning Movement Data - When movement information is required and twelve parameter values are to be entered, one for each movement, data will be entered starting with the right-turn movement on the north approach followed by the through movement and left-turn movements on the north approach, then continuing with the right, through, and left on the east, south, and west approaches (movement numbers 1, 2, 3, up to movement 12). When data is required for a specific movement, the movement should be specified using numbers 1 through 12.



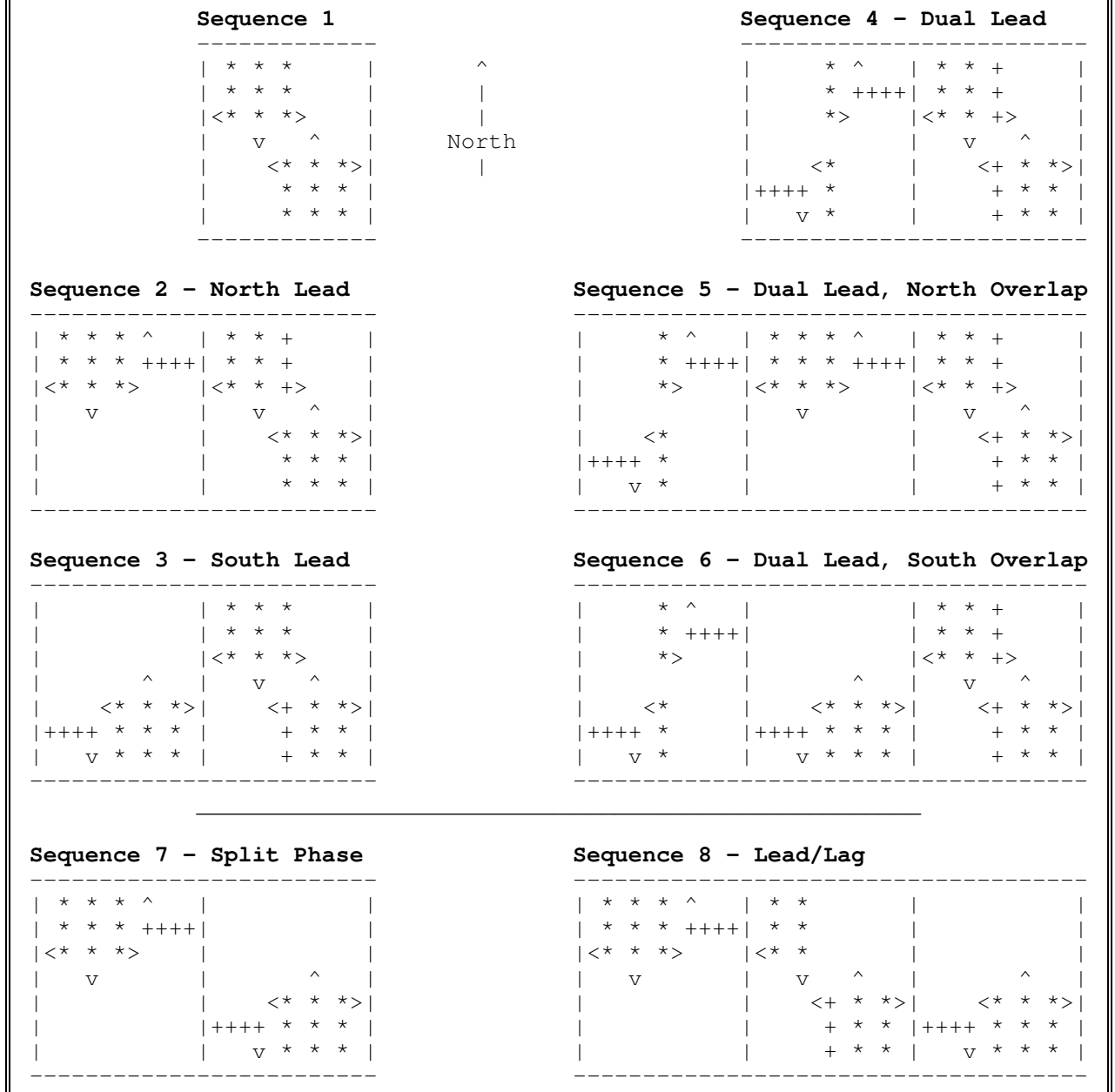
Intersection approach and turning movement data are entered in the order shown in this figure.

Figure 1-1
Intersection Approach and Turning Movement Conventions

Phasing Sequence Codes

All TEAPAC programs which require phasing information for an intersection use the same basic phasing codes on the SEQUENCES entry to represent complex phasing schemes with simple two-digit codes. The first digit represents the type of phasing for the north/south movements, while the second digit represents the type of phasing for the east/west movements. The phase codes allowed for north/south and east/west are identical, the east/west codes simply being the north/south code rotated clockwise 90 degrees. This basic phasing code can be augmented by entries to change the order of the basic sequence code (LEADLAGS), by adding permitted left turns before or after exclusive left turn phases (PERMISSIVES), and by adding right turns which

overlap into the other direction's phases (OVERLAPS). Figure 1-2 illustrates each of the eight basic phase types, with an example of how they are combined to create a SEQUENCE phase code.


Sequence 1
Sequence 4 – Dual Lead
North
Sequence 2 – North Lead
Sequence 5 – Dual Lead, North Overlap
Sequence 3 – South Lead
Sequence 6 – Dual Lead, South Overlap
Sequence 7 – Split Phase
Sequence 8 – Lead/Lag

Rotate diagrams clockwise 90 degrees for phase types of East/West movements. Use PERMISSIVES to allow left turns shown with "+" symbols. Use OVERLAPS to allow right turns shown with "+" symbols where exclusive right turn lanes exist. Use LEADLAGS to reverse the order of a phase type. Phase types are combined for both directions to create a sequence code. E.g., SEQUENCE 53 is a Dual Lead, North Overlap (5) for the North/South movements followed by a West Lead (3) for the East/West movements.

Figure 1-2
Phasing Codes for PRESYNCHRO

Version Number

The version number (x.yz) and date describe what revision of the program is being used. Minor revisions of the program increment the z-part of the version number, with more significant changes affecting the y-part of the version number. The version number itself (x) changes when major program changes are made. The date reflects when the given version of the program was introduced. The version number and date of the program is displayed using the Help-About menu. It is also displayed in each printed report title. This information should match the title page of any printed program documentation or the Help-Version menu of the on-screen documentation. If this is not the case, check by using the Help-RecentChanges menu for addenda which explain changes which have been implemented since your documentation was prepared. These addenda should be printed and inserted in Appendix H in the back of the manual for future off-line reference. The version number of the TEAPAC Interface used in the program is also displayed with the Help-About menu.

Input Modes

The Main Menu of the Visual Mode is the first display. This is where all program actions can be initiated, including data entry and computations. Each line of a menu uses a command keyword to describe what that menu line selection will allow the user to accomplish. For sub-menus, a 'group name' is used to label the primary menu line.

Menu selections can be made with the mouse, or with the underlined Alt keys (and the Enter key, if required). When this is done, a dialog box is displayed which allows entry or editing of current data values, or execution of action dialogs with the Execute button. Dialog boxes can be terminated with the OK button, the Close button, or the ESCape key.

The Main Menu can be used to select the Tabular View as an alternate input environment using the View menu. In Tabular View displays, each line of the display is preceded by a command keyword which describes the contents of the command line. The bottom line of the dialog provides HELP on how to use this command. If this command is an action command it requires use of the Execute button to perform the action. The Help (?) button can be used to access context-sensitive on-screen help. The Tabular View can also be toggled using the F3 key.

The Main Menu can also be used to select the Manual Mode as another alternate input environment using the Options menu. This mode allows quick entry of the same command lines of the Tabular View, but without the rigid structure of the Tabular View dialog box. The Manual Mode is indicated by the presence of the command prompt in the Manual Mode window, as shown below:

→

When a command prompt is displayed, the program is ready to accept command keyword input. Input is the same as a line of the Tabular View display, but must be preceded by the command (or abbreviation) which is to be used for the input. The Manual Mode can also be toggled using the F4 function key.

Example Data Entries

When executing the "hands-on" examples in this manual, actual entries to be made by the user are shown here in **BOLDFACE CAPITAL LETTERS**. The information which precedes these values indicates what command keyword should be used, showing both the menu line group name and the command name. In the Visual Mode, the menu group name in square brackets [xxx] can be found in the Edit menu to change data entries or the command keyword can be found in the Results menu to execute actions. In the Manual Mode, only the command keyword and parameter values need to be entered after the command prompt, followed by the OK button or ENTER key. For example, consider the entry below which might be found in the manual.

[Basic] → **VOLUMES 225 665 165** ...

In the Visual Mode, Basic should be selected from the Edit menu, then the VOLUMES item should be selected and the values entered, each followed by TAB, then the Execute button. In the Manual Mode, following the command prompt, simply enter the "VOLUMES 225 665 165" information followed by a single ENTER key or the OK button. The result is the same in either case: VOLUMES values are set to the three values listed.

When an ellipsis "..." appears in this document, this indicates that the additional input fields which are displayed in the Visual Mode need not be entered, thus using any current/default values which are displayed. In the Manual Mode, the ellipsis is ignored (and should not be typed), thus retaining any current/default values which may exist. If an asterisk "*" appears separated from other characters, this means to skip over the input field for the asterisk to use/retain that field's current/default value.

Parameter Symbols

When discussing the use of PRESYNCHRO entries in the documentation or in using HELP in the program, descriptions of parameter values to be entered for each command will be shown enclosed by the angle bracket symbols, "<" and ">". A typical command keyword and parameter value HELP line is shown below:

FILES 5*<File Name>

In this example, FILES is the command keyword or menu selection to be used. The "5*" indicates that up to five <File Name> parameter values may be entered in the Visual Mode or on an input line. In the Manual Mode, these follow a typed FILES command, each separated by at least one blank. The number preceding the asterisk (five in this example) indicates the number of parameter values that may be entered on an input line for the command. In some cases, all parameter values must be entered, while in others only some are required. If all values are not entered, the ones not entered will remain unchanged.

This same HELP line is provided at the bottom of each dialog box for immediate on-screen HELP for the command line currently selected in the display. The F1 key or the Help button can

be used to bring up the associated part of the on-screen manual. The *TEAPAC Tutorial/Reference Manual* gives extensive detail on how to enter parameter values in either the Visual or Manual Mode.

Review of TEAPAC Procedures

Before beginning the example problem in Chapter 2, it is worthwhile to review the basic procedures of running TEAPAC programs. There are four basic steps of an analysis using a TEAPAC program: Data Entry, Data Review, Analysis and Evaluation. This section briefly describes each step of this procedure which is used by all the TEAPAC programs. Additional detail can be found in Chapter 3 of the *TEAPAC Tutorial/Reference Manual*.

Data Entry
Data Review
Analysis
Evaluation

Data Entry

The first step in using any TEAPAC program is to enter the data required to describe the problem. This is normally accomplished using the Edit Menu and its sub-menus. Data may also be loaded from a disk data file (created earlier with the save options of the File menu) by using the Open option of the File menu. If a multi-scenario structure has been created in the file by the SCENARIO program, then a specific scenario case can be retrieved with the GetScenarioCase option of the File menu. TEAPAC programs contain default values for many of the parameter values; however, there are some parameter values which must be entered for each analysis to adequately define the problem. The dialog box display shows all of these default values.

Data entry may also be accomplished in the Manual Mode, particularly when a known and small group of command keywords are to be used. In this mode, the HELP command is useful in identifying those commands which can be used to enter these necessary parameter values. The commands can be entered directly with their parameters, or the ASK command can be used to generate a custom input/editing session with a specified sequence of dialog boxes (Normal View) or a specified list of input lines (Tabular View).

Before entering the detailed data above, the analysis network can be created on-screen in the main window with the use of the mouse in most TEAPAC programs (not in NOSTOP or TUTOR). Creating the network in this manner replaces the need to do it using the Edit menu (as above), and the network data can be edited further by additional mouse actions in the main window, or with the Edit menu. After the network is entered, the data for each intersection can be entered by right-clicking the intersection and using the same menus which appear in the Edit menu described above.

A network is created with the mouse by first clicking anywhere in the main window to reveal a grid with 500' spacing, then clicking the 'Create Link' button in the Edit Mode section of the left-

side toolbar. In the Create Link mode, simply click down at the location of the beginning of the link (street), drag the mouse to the position of the end of the link, and release the mouse. A link terminated by two 'dummy' nodes will be shown. Any time a created link crosses an existing link, a 'real' analysis intersection is created and numbered in increasing order starting from #1. Dummy nodes are numbered in decreasing order starting from #999. In the 'Select Intersection' mode, the intersection which is clicked becomes the 'current' intersection for which any subsequent entered data will belong or results may pertain. The current intersection can also be selected with the Intersection dialog of the Edit menu or the Select Intersection toolbar button under the main menu (or with the ^-Home key combination). When dragging the mouse, the status bar at the bottom of the window shows the coordinate location of the mouse cursor, as well as the distance of the cursor from the 'current' intersection. Using the Pan & Zoom buttons allows the user to move around the network, as necessary.

If a bitmap file (.bmp) of appropriate resolution exists for the study area, (for example, an aerial photograph or map) that bitmap can first be identified and calibrated with the Setup button on the left-side toolbar. The file must be in the same folder that the data file (will) reside(s) in. If the data file already exists, and the bitmap has the same primary file name, then entering '*' as the bitmap file name will connect the two files automatically. Like data files, bitmap file names should not have more than 8 characters or have any spaces in the name. When creating a network from scratch, it is best to first calibrate the bitmap scale by entering a known distance and the number of pixels in the bitmap that represent that distance. The Click button to the right of the bitmap distance entry can be a convenient way to establish the pixel distance. For example, if the distance between two intersections on the bitmap is known, type that distance in the known distance field and use the mouse to click and drag a box with opposite corners located at those two intersections. A base point for the coordinate system can also be established with the translational relationship entries found in the top portion of the dialog. Once a network has been created, its shift and scaling can be modified by changing the same Setup dialog entries, or equivalently with the Anchor and Stretch buttons in the Adjust Display left-side toolbar.

Once a network has been created, the 'Move Intersection' Edit Mode button can be used to relocate any intersection or dummy node. By default, the link distance for all links connected to the moved node will be modified according to the move made. If the move is simply to better match the underlying bitmap and the link distances have already been entered and verified, the Adjust NETWORK checkbox in the Setup dialog should be unchecked to prevent the existing distances from being changed. (Each time the program is first run, this option is set to the selected status.) The 'Insert Bend Node' Edit Mode button can be used to create a dummy node on the link nearest to the click location so the network more precisely reflects curves in the network.

When creating legs to any intersection, use care to meet the standard TEAPAC requirement that each intersection can have only 4 legs and understanding that these legs will be assigned to the four positions North, East, South and West, regardless of their actual orientation. If two skewed legs might be interpreted by the program to have an approach angle which assigns them both to the same leg of the intersection, initially create the legs with angles are such that they do not conflict, then Move the upstream external or bend node to correctly orient the leg visually.

Data Review

Once data has been entered, it should be checked for accuracy and correctness. In the Visual Mode, or when using the ASK command for input, this process is direct and immediate, since all of the current values of the entered commands are continuously displayed. The View-Summary menu is also a quick way to see all current data entries. In the Manual Mode, the TEAPAC commands DATA and SUMMARISE are used for data review. These commands display the current parameter values contained in the program. If no data has been entered for a command, its current values will be the default (RESET) values. If incorrect data is detected, it may be corrected using either of the data entry techniques described above. In the Manual Mode, the ASK command is frequently a good way to check data integrity, since it displays all values, and also allows immediate re-entry in the dialog box display if an error is found.

Analysis

The third step in program execution is to perform an analysis using the current parameter values. When satisfied with the accuracy of the program data, it is possible to use one or more of the commands in the Results Menu ([RESULTS] commands) to perform an analysis. All TEAPAC programs have one or more [RESULTS] commands which cause the program to act on the current data. These commands typically produce a report which displays the results of the analysis. Since more than one analysis may be required to generate the desired results, several [RESULTS] commands may be used at this step in the procedure.

Action commands can be executed by first selecting the Results Menu. This contains all of the action commands which are specific to PRESYNCHRO. If the parameter values need to be changed first, they should be entered in the dialog, then the Execute button is pressed to execute the selected function.

In the Manual Mode, the action command need only be typed at the command prompt, followed by any desired parameter values to control the action, then the ENTER key or OK button.

Evaluation

After executing an action function(s), the results contained in the report(s) must be evaluated for reasonableness and to determine if subsequent analyses are required. Additional analyses may be necessary for a variety of reasons. One of the most common reasons for further analyses is to test adjustments to the input conditions. These could be in the form of simulated before and after studies or testing multiple scenarios. Another type of evaluation might be a sensitivity analysis to refine initial results or identify how a specific parameter value impacts the overall results. In any of these cases, the methods described above for data entry, review and analysis should be used.

CHAPTER 2

Initial Example

Chapter 2 Topics

In order to illustrate some of the basic commands and procedures essential to using the PRESYNCHRO program, as well as to provide some experience using them and observing the program's responses, an example problem has been developed which can be analyzed with the PRESYNCHRO program. Consider the following basic traffic problem.

Chapter 2 Topics

Chapter 2 Introduction
Description of Example Problem
Data Entry
Data Review
Analysis
Evaluation
Exiting the Program
Additional Concerns

Description of Example Problem

The three-signal arterial system shown in Figure 2-1 is to be timed using the SYNCHRO model. The PRESYNCHRO program is to be used as a pre-processor to the SYNCHRO model. The system currently has timings for each isolated intersection from SIGNAL2000 based on true-HCM capacity analysis, but no system offsets. The phase diagrams and timings are shown in Figure 2-2. Table 2-1 contains the demand volumes to be used for each intersection, while Table 2-2 contains the saturation flow rate for each lane group shown in Figure 2-1. Both tables are organized by approach, the way all input to TEAPAC programs is performed, as described in Chapter 1. The task is to generate a SYNCHRO input file, produce a report which shows the phasings and timings, and plot a time-space diagram using the existing splits and offsets. In addition, use the SYNCHRO-generated offsets to re-plot the time-space diagram.

Table 2-1
Demand Volumes for Example Problem

Approach	From North			From East			From South			From West		
Intersectn	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
#13 Monroe	122	216	80	79	722	187	212	310	198	139	660	134
#14 Main	150	813	244	0	1296	589	0	0	0	386	620	0
#15 Water	0	0	0	466	780	0	386	135	453	0	573	291

Table 2-2
Saturation Flow Rates for Example Problem

Approach	From North			From East			From South			From West		
Intersectn	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
#13 Monroe	0	2410	0	0	2771	1433	0	2337	1433	0	2525	1448
#14 Main	0	5296	0	0	3041	2606	0	0	0	1448	2634	0
#15 Water	0	0	0	1359	3387	0	1345	4402	0	0	2486	1300

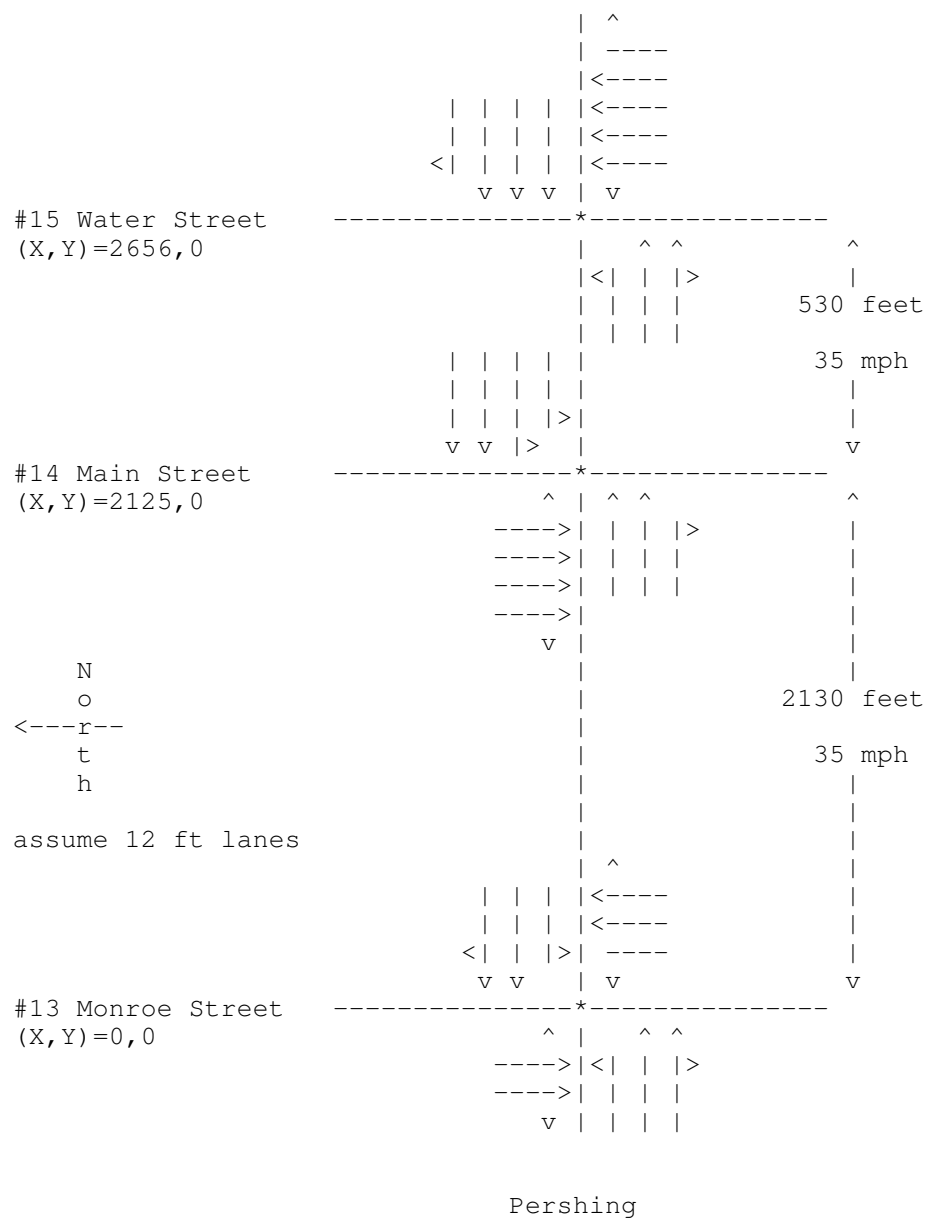


Figure 2-1
Intersection Geometrics for Example Problem

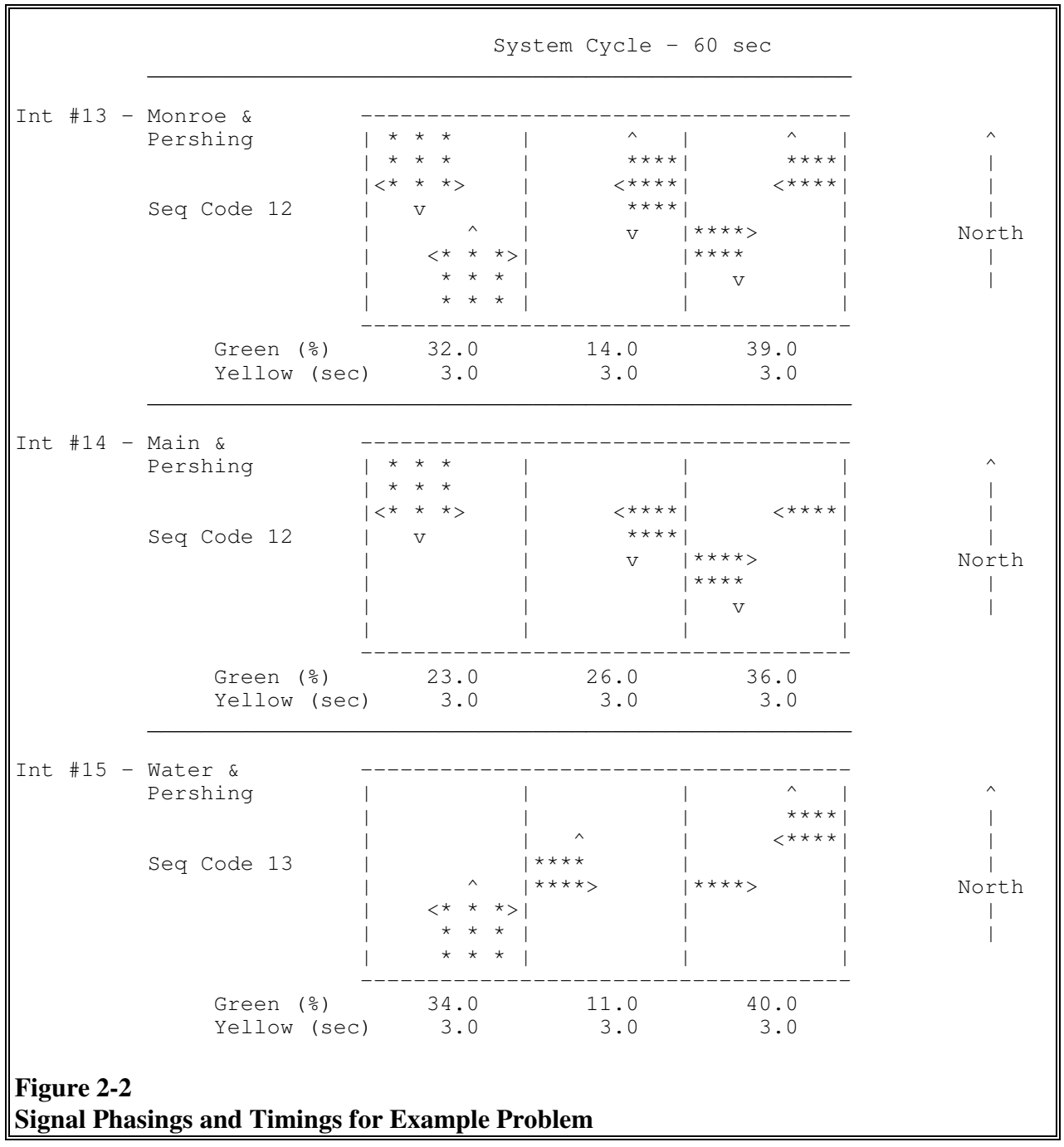

System Cycle - 60 sec
Int #13 - Monroe & Pershing
Seq Code 12
North
Green (%) 32.0 14.0 39.0
Yellow (sec) 3.0 3.0 3.0
Int #14 - Main & Pershing
Seq Code 12
North
Green (%) 23.0 26.0 36.0
Yellow (sec) 3.0 3.0 3.0
Int #15 - Water & Pershing
Seq Code 13
North
Green (%) 34.0 11.0 40.0
Yellow (sec) 3.0 3.0 3.0

Figure 2-2
Signal Phasings and Timings for Example Problem

Data Entry

If you are not currently running the PRESYNCHRO program, do so according to the way it was installed on your computer (see Appendix G). The program will display the program name along with important licensing information. As described in Chapter 1, two input modes can be used to manipulate the program. In the examples below, the Edit menu line to select in the Visual Mode is shown in square brackets, "[XXX]", and the command line to move to is shown following the

arrow, "→". To enter the desired parameter values, move the cursor to the appropriate display area and type the value in, followed by the TAB key. Use the OK button when done entering data to return to the Main Menu. To display more entries on a single dialog box, first select the Tabular View in the View menu before entering data using the Edit menu.

To use the Manual Mode for this tutorial, select the Manual Mode from the Options menu, or simply press F4. Once the program is ready to accept input, it will display the command prompt arrow. To enter the desired parameter values, enter the command keyword and parameter values, each separated by a space, all followed by the ENTER key. If the Visual Mode is desired at any point, simply press the F4 function key.

If you wish, you can use the drag-and-drop graphical network creation method to create your analysis network in the main window before entering detailed data. To do this, follow the instructions in the Data Entry section of Chapter 1, working from left-to-right so that the intersections that are created are numbered in the correct order. Use the "distance from the current node" information in the status bar to get your intersection spacings correct (approximate is adequate for the example). After the network is created, the additional detailed data described below can be entered by right-clicking on the appropriate intersection, including a check of the data already created by the drag-and-drop network creation. The intersections can also be re-numbered to the numbers used here with a right-click option.

The first step in using any TEAPAC program is to enter the data required to describe the problem to be solved. This is accomplished using commands designated as [PARAMETERS] commands, such as VOLUMES and WIDTHS. The Commands option of the Help menu can be used to display help for all commands.

The Help-Commands menu displays all commands, along with information on how to use each. Note the number of parameters for each command and their associated default values. For example, the VOLUMES command requires volumes for the twelve (12*) possible movements at the intersection.

Since a lot of commands exist, getting HELP for a smaller group might be appropriate. The [BASIC] group consists of only those commands which are essential to solving problems with PRESYNCHRO. These commands can be viewed by issuing the following command from the Manual Mode.

→ **HELP [BASIC]**

If help for only one command is needed, the HELP command will display the same detailed HLP file information for that command which is produced by the Help buttons in Visual Mode dialogs. For example, use the following Manual Mode entry to obtain complete help for the NODELIST entry to be made in the next paragraph.

→ **HELP NODELIST**

Now let's enter the information needed to describe the problem. The first entry should be the list of valid node numbers for the system (NODELIST).

[Basic] → **NODELIST 13 14 15**

This information sets up the system data, while the entries below describe the conditions at each individual intersection. Note that the INTERSECTION command identifies which intersection the data that follows applies to. In the Tabular View, INTERSECTION is an active command which needs to be executed with the Execute button in order to change the screen's values to the new intersection. Also, when entering the movement parameters in the Manual Mode, PRESYNCHRO expects the data to be entered starting with the North approach right-turns and proceeding clockwise around the intersection, as shown below. See Chapter 1 - Conventions for more detail. The Visual Mode entry order is the same, as shown in the dialog box. Enter the following information for intersection 13.

[Basic] → **INTERSECTION 13 MONROE**

[Basic] → **NODELOCATION 0 0**

As an efficiency aid, one can move to the next dialog box in sequence as shown in the Edit menu with the Next button instead of using the menu each time. Thus, instead of pressing the OK button after the INTERSECTION entry above and using the Edit menu to select NODELOCATION, simply press the Next button.

[Basic] → **NETWORK EAST 2130 35 14** ...

[Basic] → **VOLUMES 122 216 80 79 722 187 212 310 198 139 660 134**

[Basic] → **WIDTHS 0 24 0 0 24 12 0 24 12 0 24 12**

[Basic] → **SATFLOWS 0 2410 0 0 2771 1433 0 2337 1433 0 2525 1448**

[Basic] → **SEQUENCE 12**

[Basic] → **CYCLES 60 60** ...

[Basic] → **GREENTIMES 0.32 0.14 0.39** ...

[Basic] → **YELLOWTIMES 3.0 3.0 3.0** ...

The NODELOCATION command is used to provide the X,Y coordinates of the intersection. The NETWORK command is used to connect each intersection to adjacent intersections by indicating which intersection node number is upstream of each approach. It also indicates the distance between these two nodes and the average speed at which vehicles travel this distance. In the case of the WIDTHS entries, note that if right- or left-turning movements do not have

exclusive turn lanes, the WIDTH entry is zero. Also note that the width given is for all lanes in each lane group. The SATURATIONFLOWS values are given for each non-zero lane group WIDTH. The phasing for each intersection is given by the SEQUENCE code according to the codes listed in Figure 1-2. The timings for each phase are entered with the CYCLES, GREENTIMES and YELLOWTIMES commands in the order of the phasing.

Now use the INTERSECTION command to change to the next intersection and enter the following information for intersection 14.

[Basic] → **INTERSECTION 14 MAIN**

[Basic] → **NODELOCATION 2125 0**

[Basic] → **NETWORK EAST 530 35 15** ...

[Basic] → **NETWORK WEST 2130 35 13** ...

[Basic] → **VOLUMES 150 813 244 0 1296 589 0 0 0 386 620 0**

[Basic] → **WIDTHS 0 48 0 0 24 24 0 0 0 12 24 0**

[Basic] → **SATFLOWS 0 5296 0 0 3041 2606 0 0 0 1448 2634 0**

[Basic] → **SEQUENCE 12**

[Basic] → **CYCLES 60 60** ...

[Basic] → **GREENTIMES 0.23 0.26 0.36** ...

[Basic] → **YELLOWTIMES 3.0 3.0 3.0** ...

Finally, select intersection 15 and enter its information, as follows.

[Basic] → **INTERSECTION 15 WATER**

[Basic] → **NODELOCATION 2656 0**

[Basic] → **NETWORK WEST 530 35 14** ...

[Basic] → **VOLUMES 0 0 0 366 780 0 386 135 453 0 573 291**

[Basic] → **WIDTHS 0 0 0 12 36 0 12 48 0 0 24 12**

[Basic] → **SATFLOWS 0 0 0 1359 3387 0 1345 4402 0 0 2486 1300**

[Basic] → **SEQUENCE 13**

[Basic] → **CYCLES 60 60** ...

[Basic] → **GREENTIMES 0.34 0.11 0.40** ...

[Basic] → **YELLOWTIMES 3.0 3.0 3.0** ...

The Tabular View is a particularly efficient data entry mode when lots of data is to be entered, buts lacks some of the dialog box cues that the Normal View provides. Use the View menu (or the F3 key) and the Edit menu to explore this view and see the data values you have entered. If you have entered a value improperly, simply re-enter the proper value. The next section shows how you can verify all entries, particularly if you are using the Manual Mode.

Data Review

Once data has been entered, it should be checked for accuracy and completeness. In the Visual Mode, this process is simply a matter of reviewing the data entered in each dialog, since this reflects the actual current values. In the Manual Mode, DATA and SUMMARISE are used for this data review. Either of these commands may be used to display the current parameter values for the PRESYNCHRO entries. SUMMARISE provides a formatted summary report for all of the command parameter values, while DATA displays only the parameter values for the list of commands requested. To illustrate this operation, in either the Visual or Manual Modes, enter the following. Note that again, since this is an active command, the Visual Mode requires that the Execute button be used to execute the command. The View-Summary menu can also be used.

[Datafiles] → **SUMMARISE**

The current values of all input commands are listed with the values just entered, as well as any default values which were not entered. Note that the movement parameters, such as VOLUMES and WIDTHS, have approach and movement labels and a report title is displayed. The DATA command only displays the information, without any special formatting.

[Datafiles] → **DATA INTERSECTION VOLUMES WIDTHS**

The program displays the current parameter values for only the INTERSECTION, VOLUMES and WIDTHS commands of the current intersection. Note that no other command's values are listed, nor are there any headings. Since DATA accepts other commands as parameter values, DATA can be requested for only one, several or all commands, where SUMMARISE always gives all values. This makes DATA quicker to use, but less clear for others to review other than on the computer display.

Note also that the VOLUMES and WIDTHS listed are only for the "current" intersection, as defined by the current value of the INTERSECTION command. To review information for any given intersection, precede the data command with the proper INTERSECTION command, as below.

[Basic] → **INTERSECTION 13** ...

[Basic] → **DATA VOLUMES SATFLOWS**

[Basic] → **INTERSECTION 15** ...

[Basic] → **DATA VOLUMES SATFLOWS**

The most efficient way to check input from the Manual Mode is to use the ASK command. This displays the current values of the commands "ASKed for" in a dialog box display which provides on-screen HELP and allows the user to move the cursor among the data fields and even change any values desired (just like the Visual Mode). Try the following from the Manual Mode, both in the Normal and Tabular Views (use F3 to toggle between views):

→ **ASK [BASIC]**

In the Visual Mode, the "+" and "-" buttons can be used at any time to increment and decrement the intersection number displayed in the dialog, according to the order defined in the NODELIST. The Ctrl-PageUp and Ctrl-PageDown keys (^Page-Up/Down) may also be used as shortcut keys, as long as no changes have been made to input fields in the dialog. If a change is made, first TAB to the next field, then use ^Page-Up/Down. Try this as the quickest way to review and/or edit data input for each intersection.

Review the data values listed using any of the methods described above. Note that there is an error in the VOLUMES entered for intersection 15. The right turn on the east approach should be 466, not 366. To correct this, re-enter the VOLUMES entry with the proper value using either of the entry modes, Visual or Manual.

[Basic] → **VOLUMES * * * 466** ...

Note that in either mode, only the value to be changed need be entered. In the Visual Mode, the cursor is moved to the field with the 366 value and the 466 is typed right over the 366, followed by TAB or ENTER. In the Manual Mode, the VOLUMES command is typed followed by 3 asterisks used as place holders to skip the first three entries.

It is frequently desirable to print the summary of input values, both as a document to use in the input checking process, as well as a physical record of the input data used in subsequent analyses. Use of the printer is easy with PRESYNCHRO. Simply use the File-Print menu of the output window (or Ctrl-P) to direct the output to the default printer. Various available printers and printer options can be selected using the Setup options in the File menu, and the last produced

output can be printed from the File menu of the main window. If your printer is connected, perform the above sequence for the SUMMARISE command to get a printed summary of input, then recheck all the data input for proper values before proceeding.

Analysis

The third step in program execution is to perform an analysis of the current data. Once satisfied with the accuracy of the input data, use the TIMINGS command in the Results menu to execute a PRESYNCHRO analysis.

[Results] → **TIMINGS** ...

The TIMINGS command produces a report which summarizes the current timings and calculates the offsets to the beginning-of-green and beginning-of-yellow for all phases. These calculations can be useful in implementing the timings in the field. A complete phase diagram is also displayed to clarify which phase each timing belongs to.

The PLOT command is another useful command which displays a time-space diagram for the selected nodes in the NODELIST. As an example of this option, type the following.

[Results] → **PLOT 500** ...

The PLOT command generates a time-space diagram for the current timings. The horizontal axis represents time in percent of cycle and the vertical axis is distance in feet. Note that the PLOT command has two parameter values, <Scale> and <List of Nodes>. In the above analysis, the time-space diagram was plotted for all nodes in the node list at a scale of 500 feet per line.

The EXPORT command is used to create an input data file-set for the SYNCHRO model.

[Results] → **EXPORT AUTO YES** ...

Note that while the EXPORT is in process, the program displays on the screen what is being written into the file. The file-set is ready to be used with the SYNCHRO program, and if SYNCHRO is referenced properly in the Options-Setup menu of PRESYNCHRO, the AUTO option selected above will launch SYNCRHO automatically and it will be ready to open each of the UTDF files which were created by using the Transfer-DataAccess menu.

Evaluation

One powerful aspect of TEAPAC software is the capability to quickly test multiple scenarios or conditions in an interactive environment. For example, to manually input the offsets generated by a run of the SYNCHRO program, simply use the following command entries.

[Intersection] → **INTERSECTION 13** ...

[Intersection] → **OFFSET 0.65 2**

[Intersection] → **INTERSECTION 14** ...

[Intersection] → **OFFSET 0.88 2**

[Intersection] → **INTERSECTION 15** ...

[Intersection] → **OFFSET 0.02 2**

If SYNCHRO optimized results are output to a UTDF file-set, IMPORT will read this file-set to import the optimized timings directly into PRESYNCHRO without the need for the manual inputs illustrated above. For example, to import the optimum timings from the example EXPORT AUTO run above, type the following:

[Results] → **IMPORT AUTO YES TIMINGS**

Now the optimum timings and time space diagram can be reviewed with the TIMINGS and PLOT commands.

[Results] → **TIMINGS** ...

[Results] → **PLOT 500** ...

Compare the new time-space diagram to the original diagram. Note that in the first diagram the offsets were zero and no progression was achieved, while in the second diagram there is a definite band of progression.

While the example problem is over-simplified, it does demonstrate that PRESYNCHRO's interactive analysis and design techniques allow many conditions to be tested quickly and efficiently. In addition, printed reports can be produced to document the analysis, and analysis conditions can be saved at any time, as illustrated below.

At this point of the analysis, we may feel we have an adequate solution to the problem, and wish to SAVE the data values which created the final results for future use. The typical Save/SaveAs options of the File menu are normally used, but the [DATAFILES] commands of the File menu also offer these capabilities by first defining the disk FILE name to be used for storage, then issuing the SAVE command to save the parameter values.

[Datafiles] → **FILES SAMPLE/N** ...

[Datafiles] → **SAVE 1 1** ...

Note that the file name "SAMPLE" has a "/N" switch added to its name the first time it is used to indicate to PRESYNCHRO that you expect to create a new file. This is not required, but saves the steps of responding to the new file creation query. When used, an error will be produced only if this file name already exists. Other such switches and file name conventions are discussed in Appendix G, as they relate to your operating system. Also note that as many as five files can be named at any given time, and that the SAVE command describes which of these five files are to be used. The SAVE command can also tell the program where in the file to save information, allowing different scenarios to be stacked one after the other in the same file. The LOAD command is used to retrieve the information at a later date. All of these options relate to advanced file manipulation capabilities such as batch control file scripts and multiple scenarios, described in detail in the *TEAPAC Tutorial/Reference Manual*.

Exiting the Program

Additional experiments may be conducted at this point. When finished, the Exit option of the File menu can be used. In the Manual Mode, the STOP (or QUIT) command can also be used.

[Control] → **STOP** ...

Control of the computer is returned to the operating system. This step is not necessary if you will continue with the examples of Chapter 3.

Additional Concerns

The procedures and commands presented in this chapter are representative of the functions which can be performed using the PRESYNCHRO program. A number of important aspects were not presented in the interest of simplifying the example problem. Specifically, default values were used for many of the possible parameter values of the program. These parameter default values may not be appropriate for the conditions to be studied and thus may require modification.

As another example, one important command option not discussed in this example is the SUBSYSTEM command which allows a subset of the network to be exported to SYNCHRO in Usage Level 2 and 3 versions of PRESYNCHRO.

These procedures, as well as other important elements of the complete use of the PRESYNCHRO program, are discussed in detail in Chapters 3, 4 and 5, and should be addressed as soon as you are comfortable with the basic elements discussed in this initial example.

CHAPTER 3

Analysis Procedures

Chapter 3 Topics

Having stepped through the example problem in Chapter 2, it is now possible to discuss in greater detail the actual procedures and entries used to perform analyses using the PRESYNCHRO program. This chapter discusses the minimum input requirements to conduct a reasonable analysis, as well as practical limitations of the program. Then appropriate analysis procedures are explained. This chapter is designed to fully explain the operation of the PRESYNCHRO program and provide additional understanding of the example shown in Chapter 2.

Chapter 3 Topics

Chapter 3 Introduction
Input Requirements
Analysis Procedures

Input Requirements

This section discusses the basic input requirements for PRESYNCHRO. It begins with a discussion of the minimum input requirements to produce various reports, and then discusses the limitations to data input which exist. This section is quite important in that it sets the minimum information for valid results, as well as the limitations of the program.

Minimum Input Requirements
Input Limitations

Minimum Input Requirements

Many of the input parameter values have defaults which eliminate the need to enter data for every parameter. After the program is started or the File-New menu or RESET [PARAMETERS] command is issued, these default values can be viewed in any of the input dialogs of the Visual Mode or with the DATA or ASK commands in the Manual Mode. The

default values of each command are also listed in the right-hand section of the HELP displays which are generated by the Help-Commands menu or the HELP command in the Manual Mode.

On the other hand, there are a number of commands for which it is necessary to input data in order to produce legitimate results. The most obvious of these are the NODELIST and SEQUENCE commands to describe the intersections under study and their phasings. Values for these commands are needed to do most any function of the PRESYNCHRO program. As such, examples of these inputs were illustrated in the initial example of Chapter 2. For an approximate modeling effort, only a few of these commands may be needed. For a more detailed operations analysis, the other commands which describe intersection conditions completely should be used, although each has a preset default value which may be usable in an analysis. Each of the input parameters for these commands should be reviewed to check the appropriateness of the default values using the View-Summary menu or the dialog boxes of the Edit menu.

The PRESYNCHRO program has three basic modes of operation, one where an export of input values to SYNCHRO is desired, another where phasing and timing diagrams for each intersection is desired, and a third where a time-space diagram of input conditions is desired. The input requirements for these three modes are noticeably different, and thus are discussed below in separate sections.

EXPORT Inputs. The EXPORT mode means that a complete set of conditions are given in order for the program to code these inputs for SYNCHRO and produce a complete and valid SYNCHRO model. This means that the NODELIST command must be entered for the system to define the intersection numbers which will be used. Then for each INTERSECTION, the NETWORK, VOLUMES, WIDTHS, SATURATIONFLOWS and SEQUENCES commands must be entered. After defining for which INTERSECTION the following inputs will apply, the NETWORK command describes the speed and distance relationship of the intersections, the VOLUMES describes the demand volumes for each of the 12 possible turning movements, and the WIDTHS and SATURATIONFLOWS describes the lane use configuration and capacities of each. The SEQUENCES command is used to specify the phasing according to the sequence code method discussed in Chapter 1.

If a simulation of given conditions is desired, this is indicated with the OPTIMIZE command (NONE, a simulation, is the default), and GREENTIMES and YELLOWTIMES must be given for each phase, as well as the CYCLE and OFFSET. Only GREENTIMES and YELLOWTIMES are required if only the offsets will be optimized, but if splits will also be optimized, as indicated by the OPTIMIZE command, then the GREENTIMES and YELLOWTIMES are not needed and the MINIMUMS are required. If a version of SYNCHRO other than the most current version is to be used, this must be indicated with the OUTPUT command.

Optional inputs include the SIMULATION command to set parameters which define the type of simulation to be performed, and the MASTERNODE command to define which intersection represents the master node. The NODELOCATION, RIGHTTURNONREDS, LANES, GROUPTYPE, TRUCKPERCENTS, PEAKHOURFACTORS, ACTUATIONS,

STARTUPLOST, ENDGAIN, STORAGE, LEADLAGS, PERMISSIVES, OVERLAPS and PHASEMOVS commands may also be used to further define the intersection coordinates, movement's RTOR, lanes, lane groupt types, heavy vehicles, peak hour factors, actuated, startup lost time, end gain time and storage conditions, and the SEQUENCE of operation at each signal. Route entries may also be used to define specific arteries in the system. If a subset of the entire nodelist is to be analyzed, this can be done conveniently by using the SUBSYSTEM command in Usage Level 2 and 3 versions of PRESYNCHRO.

Timing Diagrams Inputs. In order to produce phasing and timing diagrams for each intersection, virtually the same basic inputs are required as for a simulation EXPORT, as described above, including the GREENTIMES, YELLOWTIMES and OFFSET inputs. The major exception is that the NETWORK, WIDTHS and SATURATIONFLOWS are not required, nor are any of the optional inputs described above, such as SIMULATION, etc. Note that VOLUMES are required in order to display the proper arrows in the phasing diagram. The special phasing commands may be used to further define the SEQUENCE used, and SUBSYSTEM may be used to see a subset of the NODELIST in Usage Level 2 and 3 versions of PRESYNCHRO.

Time-Space Inputs. In order to produce time-space diagrams, the input requirements are the same as the timing diagrams inputs, except that the NETWORK inputs are required and the VOLUMES inputs are not.

Input Limitations

PRESYNCHRO is designed to simulate and optimize the operation of as many as 500 four-legged intersection using the SYNCHRO program as a basis for the analyses. In accomplishing this objective, certain limitations in the input and use of the program exist. These are described in this section. In some instances, references to Chapter 5 are made where techniques are described to get around some of these limitations. None of these limitations constrain the basic use of the program for most situations, however, and this section should not be viewed as diminishing the usability of the program, but merely documenting the limitations which should be observed in its use.

Usage Level 2 of PRESYNCHRO allows the definition of up to 100 intersections; Usage Level 3 handles up to 500 intersections. Smaller systems can also be defined with these large versions of PRESYNCHRO. Usage Level 1 of PRESYNCHRO will only allow the definition of up to 12 intersections for a single analysis.

As many as four approaches can be analyzed for each intersection as long as they generally follow the geometric layout of two crossing two-way streets. The primary concern here is that the designated left turns conflict with through movements on the opposite approach as in a normal four-way intersection, since these are what the pre-coded sequences address. Sixty-four phasings can be handled automatically through use of the standard TEAPAC phase sequence numbering scheme described in Chapter 1. Through use of sequence codes less than 0 and the

PHASEMOVEMENTS command, completely arbitrary phasings can be handled, as long as the rules of describing the phasing are followed for the PHASEMOVEMENTS command.

The SYNCHRO model has some options which cannot be coded directly with PRESYNCHRO. When these options are desired, the EXPORTed SYNCHRO input file can be modified to include these features after the EXPORT. This allows PRESYNCHRO to perform the bulk of the SYNCHRO coding effort and the user to exercise the more detailed aspects of the model.

Analysis Procedures

When using PRESYNCHRO, it is important to understand the fundamentals of how the data entries and actions are used together in order to get results in an efficient and accurate manner. In the example in Chapter 2, certain processes produced specific results. In this section, these steps are reviewed and discussed in detail to provide a more complete understanding of the program functions. First the basic analysis procedures are outlined, then more specialized procedures are described. Chapter 5 describes unique ways that these basic and special procedures can be combined to solve unusual problems with PRESYNCHRO.

Basic Analysis Procedures
Special Analysis Procedures
Printing and Saving SYNCHRO Results

Basic Analysis Procedures

In performing any of the functions of PRESYNCHRO, the basic method of using the program is to enter the parameters which describe the signalized system conditions, as described in the Input Requirements above, then follow this with the either the EXPORT, TIMINGS or PLOT commands. These entries and actions are done with the Edit and Results menus, respectively. If properly installed, the AUTO option of EXPORT can be used to link directly to SYNCHRO. The Results menu allows the direct IMPORT of SYNCHRO's results and manipulation of the commonly changed values which follow a SYNCHRO run, such as OFFSETS, as well as either the TIMINGS or PLOT commands.

In the Manual Mode, all the same steps can be performed by simply entering the commands desired with their appropriate parameter values. The end of Chapter 3 of the *TEAPAC Tutorial/Reference Manual* describes how the ASK command can be used in the Manual Mode to further enhance the process of performing iterative tabulations and analyses, especially when using the special group names described in Appendix A of this document.

Special Analysis Procedures

PRESYNCHRO can also be used in a sequential manner for the typical steps of a signal timing effort. If existing timings for a network are known, it might be desirable to simulate these timings prior to a SYNCHRO optimization, then optimize the network so the simulated before

and after conditions can be compared. This is done easily using PRESYNCHRO, as described below.

First, all of the known timing and phasing information should be entered for each intersection along with the basic geometric, demand and capacity information, as described in the Minimum Requirements section above. Then the PLOT command can be issued to draw a time-space diagram of these existing conditions. The TIMINGS command can also be issued to document the complete timing and phasing information which was entered. Then the EXPORT command is used to create a simulation run of SYNCHRO, using the SIMULATION command to detail the simulation parameters. This run of SYNCHRO can also be used to check the resultant SYNCHRO model for validity and reasonableness.

Following a successful simulation with SYNCHRO, the same data can be EXPORTed to SYNCHRO, preceded by the OPTIMIZE command to describe what SYNCHRO will be allowed to optimize (only offsets, both splits and offsets, or the cycle and splits and offsets). When SYNCHRO finishes, the resultant timings can be IMPORTed into PRESYNCHRO to define the final timings and interactive time-space diagrams can be PLOTted to observe the results on screen or on the printer. The TIMINGS command can again be used to document in a clear manner what the final timings are.

From this point, it is common to speculate what would happen if certain changes to the timings are made which are intuitively "better" than those produced by SYNCHRO. This is typically the result of looking at the time-space diagrams and speculating small changes in offsets which appear to improve the progression of traffic which SYNCHRO doesn't really consider. These changes can be made easily within PRESYNCHRO and re-PLOTted with PRESYNCHRO to observe the apparent results. When a satisfactory change has been entered, these inputs can again be exported to SYNCHRO in the simulation mode so that the simulation of these timings can be compared to SYNCHRO's "optimized" timings. In addition, the SYNCHRO optimized timings can be sent to SIGNAL2000, PRETRANSYT or PRENETSIM for further assessment or optimization by these programs. Using this technique, a final set of timings can be arrived at in a quick and definitive fashion, documented with final PLOT and TIMINGS reports, and stored in the final PRESYNCHRO data file.

In Usage Level 2 and 3 versions of PRESYNCHRO, the same process can be executed for SUBSYSTEMs of the entire network to assess the potential impact of running the entire system as several independent subsystems.

Printing and Saving SYNCHRO Results

If the AUTO option of EXPORT is used to make runs of SYNCHRO directly from PRESYNCHRO, the results of the SYNCHRO run must be printed separately if the printed results are desired. This can be done from SYNCHRO directly, as desired. The name of the file group used is TMPSYN stored in the data subdirectory defined by the PRESYNCH.CFG file.

If these files are to be retained for future review or archival purposes, they must be copied elsewhere or renamed to something different than the TMPSYN name before the next EXPORT AUTO is executed, or they will be over-written by that EXPORT.

CHAPTER 4

Actions and Entry Parameters

Chapter 4 Topics

This chapter provides a summary description of all of the actions and entry parameters of the PRESYNCHRO program. The usage format of each command dialog and associated parameter values are provided along with a functional description of the command dialog. The dialogs are grouped and presented in the following three logical categories:

- [RESULTS] Dialogs - action commands for PRESYNCHRO found in the Results menu which are specific to the act of solving the traffic problem addressed by the PRESYNCHRO program, and used to control the type of analysis performed.

- [PARAMETERS] Dialogs - entry commands for PRESYNCHRO found in the Edit menu which are specific to the process of entering data for the traffic problem to be solved by the PRESYNCHRO program.

- Common TEAPAC Dialogs - entry and action commands of the PRESYNCHRO program which are common to and used by all of the TEAPAC programs. These are found primarily in the Datafiles and Control sub-menus of the File menu.

Table 4-1 describes the detailed organization of how each of the PRESYNCHRO commands is presented in this chapter, according to these categories.

Table 4-1
Organization of Command Discussions

RESULTS Dialogs
PARAMETERS Dialogs
- Commands to Enter Basic Data
- Commands to Enter System Data
- Commands to Enter Intersection Data
- Commands to Enter Additional Intersection Data
- Commands to Enter Traffic Generator Data
- Commands to Enter Traffic Count Data

Common TEAPAC Dialogs
- Commands to Aid Interactive Input of Data
- Commands to Label Output
- Commands to Control Operation of Program
- Commands to Access Data Stored in Files
- Commands to Control Program Execution

For each command discussed, the first line of a command header provides the basic usage format of the command dialog, as shown in the sample format below:

COMMAND <Parameter Value> 5*<Another Parameter>

Parameter values which are enclosed by angle brackets, "<" and ">", indicate that the bracketed description is to be replaced by a parameter value as described. If a command requires more than one parameter value of the same type, this is represented by an asterisk, "*", preceded by the number of entries expected or allowed. In the example above, as many as five of <Another Parameter> can be entered. This command header is then followed by a summary which describes the main purpose of the command. Details of the command's usage are found in Appendix B.

Remember that each PRESYNCHRO command has been classified into one or more "groups" which share functional similarities. Appendix A provides a tabular summary of all commands assigned to each command group. Appendix B provides a detailed table of information for each command, listed in alphabetical order. Appendices A and B can be used as reference documents when questions arise regarding any given group or command. Refer to Chapter 4 - TEAPAC Command Structure in the *TEAPAC Tutorial/Reference Manual* for a detailed discussion of group names.

Chapter 4 Topics

Chapter 4 Introduction
RESULTS Dialogs
PARAMETERS Dialogs
Common TEAPAC Dialogs

RESULTS Dialogs

[RESULTS] commands are the active command dialogs which perform the various analyses specific to the purpose of the PRESYNCHRO program. These commands are summarized in this section. All the details about each command dialog can be found alphabetically in Appendix B. The data entry values which must be made prior to using the active commands are listed in the following section.

EXPORT **<File/AUTO/STACK> <Display Output> <Auto Option>**
Create a SYNCHRO-compatible input data file from the current data values, with an optional automatic link to SYNCHRO.

IMPORT **<File/AUTO> <Display Output> <Import Scope>**
Import a network from a SYNCHRO UTDF file-set, or import signal timings from a SYNCHRO UTDF file-set which was originally created by a PRESYNCHRO Export.

PLOT **<Scale> <List of Nodes>**
Plot a time-space diagram for the nodes specified.

TIMINGS **<List of Nodes>**
Display the phasing and timings defined for each intersection in the list of nodes, including the system offset value.

PARAMETERS Dialogs

[PARAMETERS] commands are the data entry command dialogs used to enter the parameter values which are specific to the purpose of the PRENETSIM program. Each is summarized in the following paragraphs. First, those [PARAMETERS] commands which are the most basic entry commands are described. These commands are frequently the only ones needed to describe a signalized system completely, using the defaults for the remaining [PARAMETERS] commands. These remaining commands are then described, organized by the type of inputs they represent, including the basic commands. All the details about each command dialog can be found alphabetically in Appendix B.

Commands to Enter Basic Data
Commands to Enter System Data
Commands to Enter Intersection Data
Commands to Enter Additional Intersection Data
Commands to Enter Traffic Generator Data
Commands to Enter Traffic Count Data

Commands to Enter Basic Data

The following are the commands which are used to enter the basic data to describe the problem to be solved.

NODELIST **100*<Node Number>**
Enter the list of nodes to be simulated or optimized.

OPTIMIZE **<Optimization Type> <Step Size List>**
Enter the type of optimization to be performed. This command appears only for compatibility with PREPASSR and PRETRANSYT, and is not presently used in PRESYNCHRO.

INTERSECTION **<Node Number> <Description>**
Enter the node number of the current intersection (and an optional description) as defined in the network.

NODELOCATION **<X-Y Coordinates>**
Enter the X and Y coordinates of the current intersection.

NETWORK **<Direction> <Distance> <Speed> <Node #> 4*<Movement #> <Assignment Method> <Curvature> <Manual Distance>**
Enter the current intersection's relative location in the system network, including spatial and speed parameters.

VOLUMES **12*<Design Hour Volume>**
Enter the turning and through movement volumes for each of the movements at the current intersection.

WIDTHS **12*<Lane Group Width>**
Enter the width of the lane group for each movement at the current intersection.

PEAKHOURFACTORS **12*<Peak Hour Factor>**
Enter the peak hour factor for each movement of the current intersection.

MINIMUMS **12*<Minimum Green Time>**
Enter the minimum green time requirements for each of the twelve movements at the current intersection.

STORAGE **12*<Storage Distance>**
Enter the amount of storage distance for queued vehicles for each of the twelve movements of the current intersection.

SATURATIONFLOWS **12*<Stream Saturation Flow>**
Enter the maximum capacity for each lane group of the current intersection.

SEQUENCES **<Sequence Code>**
Enter the desired and allowed phasings of the traffic signal of the current intersection according to the codes defined in Figure 1-2 of Chapter 1.

CYCLES **<Minimum Cycle> <Maximum Cycle> <Cycle Increment>**
Enter the cycle length for the current intersection to be used for SYNCHRO's simulation or optimization, as well as a time-space plot or timing diagram.

GREENTIMES **6*<Phase Green Time>**
Enter the duration of green for each of the phases of a specified phase sequence, or optionally for each of the movements, of the current intersection.

YELLOWTIMES **6*<Phase Yellow Time>**
Enter the clearance interval at the end of each phase of a phase sequence, or optionally for each of the movements, of the current intersection.

OFFSET **<Offset> <Phase Number>**
Enter the coordinated offset for a phase of the phase sequence at the current intersection.

Commands to Enter System Data

The following are commands which can be used to describe the signalized system which is being analyzed. Some of these commands were also included in the Basic Data discussed above.

NODELIST **100*<Node Number>**
Enter the list of nodes to be simulated or optimized.

SUBSYSTEM **100*<Node Number>**
Enter the subset of the NODELIST for which subsequent actions should be taken.

ROUTE **<Route #> <List of Artery Nodes>**
Enter a list of node numbers which represent the intersections on the artery for the given route number.

MASTERNODE **<Master Node #>**
Enter the node number of the intersection which is the master node location for the system. This command appears only for compatibility with PRETRANSYT, and is not presently used in PRESYNCHRO.

QUEUEMODELS **<Model #> <Percentile> <Auto> <Truck>**
Enter parameters which control the queue model calculations used for all intersections under study.

SIMULATION **<Steps/Cycle> <Analysis Period> <Stop Penalty> <Link Numbering Method> <Model Actuated> <Assignment Method>**
Enter simulation control parameters, including the length of the analysis period for all intersections under study.

OPTIMIZE **<Optimization Type> <Step Size List>**
Enter the type of optimization to be performed. This command appears only for compatibility with PREPASSR and PRETRANSYT, and is not presently used in PRESYNCHRO.

OUTPUT **<Prog>**
Enter the version of SYNCHRO to create input for. OUTPUT is not presently used by PRESYNCHRO.

LINKLIST **200*< <Node Number> <Direction> >**
Enter the simulation order for each link in the network, primarily for earlier versions of TRANSYT. This command appears only for compatibility with PRETRANSYT, and is not presently used in PRESYNCHRO.

Commands to Enter Intersection Data

The following are commands which can be used to describe each intersection being analyzed. Some of these commands were also included in the Basic Data discussed above.

INTERSECTION **<Node Number> <Description>**
Enter the node number of the current intersection (and an optional description) as defined in the network.

NODELOCATION **<X-Y Coordinates>**
Enter the X and Y coordinates of the current intersection.

NETWORK **<Direction> <Distance> <Speed> <Node #> 4*<Movement #> <Assignment Method> <Curvature> <Manual Distance>**
Enter the current intersection's relative location in the system network, including spatial and speed parameters.

APPLABELS **4*<Approach Label>**
Enter labels for each approach of the current intersection.

MOVLABELS **12*<Movement Label>**
Enter abbreviated labels for each movement of the current intersection.

RIGHTTURNONREDS **4*<Right Turn on Red Volume>**
Enter the right turn on red volume for the right turns on each approach of the current intersection.

VOLUMES **12*<Design Hour Volume>**
Enter the turning and through movement volumes for each of the movements at the current intersection.

VOLFACTORS **<# Years> 12*<Volume Adjustment Factor>**

Enter number of times to compound and each multiplier used for each movement to adjust the volume data entered by the VOLUMES command at the current intersection.

VOLADDITIONALS <AddFactor> 12*<Additional Volume>
Enter the factor and additional volume to be added for each movement of the current intersection.

WIDTHS 12*<Lane Group Width>
Enter the width of the lane group for each movement at the current intersection.

LANES 12*<Number of Lanes>
Enter the number of lanes which are assigned for use by each of the twelve movements at the current intersection.

GROUPTYPES 12*<Lane Group Type>
Enter the special lane group type for each possible lane group, such as dual-optional lanes, free-flow lanes and sign-controlled lanes for the current intersection.

TRUCKPERCENTS 12*<Truck-Through Bus Percentage>
Enter the truck and through bus (heavy vehicle) traffic percentage for each movement of the current intersection.

PEAKHOURFACTORS 12*<Peak Hour Factor>
Enter the peak hour factor for each movement of the current intersection.

ACTUATIONS 12*<Actuated Movement>
Enter the type of phase module present, actuated or non-actuated, for each movement of the current intersection.

MINIMUMS 12*<Minimum Green Time>
Enter the minimum green time requirements for each of the twelve movements at the current intersection.

STARTUPLOST 12*<Startup Lost Time>
Enter the length of the lost time at the beginning of a movement's green period for each of the twelve movements of the current intersection.

ENDGAIN 12*<End Gain Time>
Enter the length of time that vehicles effectively extend the green period into the yellow and all-red period for each of the twelve movements of the current intersection.

STORAGE 12*<Storage Distance>
Enter the amount of storage distance for queued vehicles for each of the twelve movements of the current intersection.

SATURATIONFLOWS 12*<Stream Saturation Flow>

Enter the maximum capacity for each lane group of the current intersection.

SEQUENCES **<Sequence Code>**
Enter the desired and allowed phasings of the traffic signal of the current intersection according to the codes defined in Figure 1-2 of Chapter 1.

PERMISSIVES **4*<Permissive Left>**
Enter an option for each approach identifying the permissability of left-turning traffic to turn on a through phase following or preceding a protected left turn phase of the current intersection.

OVERLAPS **4*<Right Turn Overlap>**
Enter how right turn overlaps are to be handled for each approach of the current intersection.

LEADLAGS **2*<Lead-Lag Phasing>**
Enter the order of the phases, particularly in multiphase operation, of the current intersection.

CYCLES **<Minimum Cycle> <Maximum Cycle> <Cycle Increment>**
Enter the cycle length for the current intersection to be used for SYNCHRO's simulation or optimization, as well as a time-space plot or timing diagram.

GREENTIMES **6*<Phase Green Time>**
Enter the duration of green for each of the phases of a specified phase sequence, or optionally for each of the movements, of the current intersection.

YELLOWTIMES **6*<Phase Yellow Time>**
Enter the clearance interval at the end of each phase of a phase sequence, or optionally for each of the movements, of the current intersection.

OFFSET **<Offset> <Phase Number>**
Enter the coordinated offset for a phase of the phase sequence at the current intersection.

PHASEMOVEMENTS **<Phase Number> <List of Movements>**
Enter the movements permitted during each phase for a non-standard phasing at the current intersection.

Commands to Enter Additional Intersection Data

The following are commands which can be used to describe each intersection being analyzed but whose data values are not used by PRESYNCHRO. Their inclusion in the program is to provide seamless data file compatibility with the SIGNAL2000 program.

METROAREA **<Location>**
Enter the location of the current intersection within the metropolitan area.

LEVELOFSERVICE **<Target Delay/LOS> <Max Delay/LOS> <Delay Incr>**

<Target v/c> <Max v/c> <v/c Incr>

Enter the range of delay (or level of service) and v/c which should be tested by a DESIGN optimization and GOVERCS for the current intersection.

EXCESS **<List of Priority Movement Numbers>**

Enter the movements to which the TIMINGS command will assign available excess portions of the cycle length for the current intersection.

APPLABELS **4*<Approach Label>**

Enter labels for each approach of the current intersection.

GRADES **4*<Grade of Approach>**

Enter the grade of each approach of the current intersection.

PEDLEVELS **4*<Pedestrian Interference>**

Enter the level of pedestrian interference for right turns on each approach of the current intersection.

BIKEVOLUMES **4*<Conflicting Bicycles>**

Enter the volume of conflicting bicycles for right turns on each approach of the current intersection.

PARKINGSIDES **4*<Parking Location>**

Enter parking conditions on each approach of the current intersection.

PARKVOLUMES **4*<Parking Volume>**

Enter the number of parking maneuvers per hour on each side of each approach of the current intersection.

BUSVOLUMES **4*<Stopping Bus Volume>**

Enter the volumes of stopping buses which stop on each approach of the current intersection.

UPSTREAMVC **4*<Upstream v/c Ratio>**

Enter the v/c ratio of the upstream intersection for each approach of the current intersection.

MOVLABELS **12*<Movement Label>**

Enter abbreviated labels for each movement of the current intersection.

UTILIZATIONS **12*<Lane Utilization Factor>**

Enter the lane utilization factor for each movement of the current intersection.

ARRIVALTYPES **12*<Quality of Progression>**

Enter the quality of progression for each movement of the current intersection.

REQCLEARANCES **12*<Required Clearance>**

Enter the clearance times required for each movement of the current intersection.

INITIALQUEUE 12*<Initial Queue Size>
Enter the number of vehicles queued at the intersection at the start of the analysis period for each of the twelve movements of the current intersection.

IDEALSATFLOWS 12*<Ideal Saturation Flow Rate>
Enter the base (ideal) saturation flow rate for each movement of the current intersection.

FACTORS 12*<Satflow Adjustment Factor>
Enter satflow adjustment factors for each movement of the current intersection to adjust 2000 *Highway Capacity Manual* satflow computations.

DELAYFACTORS 12*<Delay Adjustment Factor>
Enter factors for each movement of the current intersection used to adjust the delay calculations, for example, to match delays obtained from a network simulation model.

NSTOPFACTORS 12*<Stops Adjustment Factor>
Enter twelve factors used to adjust the number of stops calculations of the EVALUATE report of the current intersection, for example, to match the number of stops obtained from a network simulation model.

CRITICALS 6*<Critical Movement Number>
Enter the movement which is critical for each phase of the phase sequence of operation of the current intersection.

PEDTIME <Exclusive Pedestrian Phase Time> <Phase Number>
Enter the time for an exclusive pedestrian scramble phase of the current intersection.

Commands to Enter Traffic Generator Data

The following are commands which can be used to describe traffic generator data for each intersection being analyzed but whose data values are not used by PRESYNCHRO. Their inclusion in the program is to provide seamless data file compatibility with the SITE program in particular, and all TEAPAC programs, in general.

SITESIZE <# of Distribution Types> <# of Inbound Types>
Enter the number of distribution types to be used to describe the inbound and outbound traffic generation.

ROUND <Precision of Totals>
Enter the precision to be used in computing the results.

BASE <Generation Base> <X-Y Coord LL> <X-Y Coord UR>

Enter the base development size for generating trips as it relates to the generation rates used for the development.

GENERATION **<Direction> <Generation Rate> 10*<Node-Dir>**
Enter the traffic generation rates and access points and access directions for the development.

PATHDISTRIBUTION **<Distr Type #> <Distr %> <Node #> <Node Dir> <Descr>**
Enter and set the current distribution type number, and enter its related distribution percentage, external node, and description.

PATHASSIGNMENT **<Path #> <Path %> <Path List>**
Enter a path (list of intersections) which vehicles of the current distribution type follow when traveling to and from the development.

ASSIGNMENT **<Type #> <Intersection #>**
12*<<Movement #> <Assignment Factor>>
Enter the percentage of a distribution type to be assigned to the movements at an intersection. This is only used to define special assignment situations, and is not normally used for typical site traffic assignment situations.

Commands to Enter Traffic Count Data

The following are commands which can be used to describe traffic count data for each intersection being analyzed but whose data values are not used by PRESYNCHRO. Their inclusion in the program is to provide seamless data file compatibility with the TURNS and WARRANTS programs in particular, and all TEAPAC programs, in general.

COUNTTYPE **<Type of Data> <Type of Truck Counts>**
Enter the type of count data which is to be supplied to the program at the current intersection, and to provide a description of the count.

PERIODS **<Count Interval> 5*< <Start Time> <Stop Time> >**
Enter the count interval and the beginning and ending times for each count period for which subsequent data will be entered at the current intersection.

CONDITIONS **<Major Direction> <# N-S Lanes> <# E-W Lanes>**
<High Speed> <Low Population>
<Progression Impact> <Remedial Actions Failed>
<# Accidents for Signal> <Stop Sign Delay>
<# Accidents for Stop> <Minor Street Delay>
Enter intersection conditions which affect the conduct of a Warrant Analysis at the current intersection.

ADTFACTOR **<Factor to Expand Counts to 24 Hour Volumes>**

Enter a factor which will be used to estimate 24-hour volumes from partial day's counts at the current intersection.

VEHICLECOUNTS <Movement or Time> <List of Counts>
Enter the count of vehicles for a count interval or movement number at the current intersection.

TRUCKCOUNTS <Movement or Time> <List of Counts>
Enter the count of trucks for a count interval or movement number at the current intersection.

Common TEAPAC Dialogs

There are 22 command dialogs common to all TEAPAC programs. These commands control interactive functions, output labeling, program operation, permanent data storage and program execution. These common TEAPAC commands are summarized in this section. All the detail about these commands is found alphabetically in Appendix B of this manual with the other commands of the program discussed previously (as well as in Appendix B of all other TEAPAC program manuals).

Commands to Aid Interactive Input of Data
Commands to Label Output
Commands to Control Operation Of Program
Commands to Access Data Stored In Files
Commands to Control Program Execution

Commands to Aid Interactive Input of Data

The commands described below have functions related to the interactive use of the program. These commands control on-screen help functions as well as provide the means to review program data. Many of these commands act on a set of commands as their parameter values.

MESSAGES <Level of Messages>
Display messages concerning changes made to the program since the last printing of the tutorial/reference manual.

HELP <List of Commands>
Display the command names, parameter descriptions, and default values for each command listed.

ASK <List of Commands>
Produce a dialog box display for each of the listed commands.

RESET <List of Commands>
Reset the parameters of the specified commands to their default values.

DATA <List of Commands>

Display the current parameter values for the specified commands.

SUMMARISE **--**
Display a formatted summary of all [PARAMETERS] values. It has no parameters.

Commands to Label Output

The four commands described below control the report headings of the program. Report headings are used to identify the conditions of an analysis. Report headings are critical when multiple analyses are performed and documentation of various conditions analyzed is required.

PROJECT **<First Title Line>**
Enter the first line of information used to identify the situation being analyzed.

DESCRIPTION **<Second Title Line>**
Enter the second line of information used to identify the situation being analyzed.

NOTE **<Third Title Line>**
Enter the third line of information contained in the title of each report.

HEADING **<Number of Lines>**
Display the current title heading lines.

Commands to Control Operation of Program

The following commands control various aspects of program operation.

ECHO **<Input/Output Echo Condition>**
Enter the echo condition flag indicating whether or not command information should be displayed after being input from or output to a file.

IODEVICES **<Visual View> <Page #> <Lines/Pg> <Last Line #>**
Set the visual view style for dialogs, as well as the page number and the size of the output medium (i.e., paper).

NEWPAGE **<Page Advance Option>**
Enter a flag indicating that the next output report should begin with title headings at the top of the next page.

Commands to Access Data Stored In Files

The following commands are used when analysis data and/or commands are to be stored in permanent data files for later use.

FILES **5*<File Name>**

Enter the names of the permanent storage file areas where information is to be LOADed and SAVEd.

SAVE **<Line Number> <File Number> <List of Commands>**
Save the current parameter values of the listed commands in permanent storage locations specified by the FILES command, for future retrieval with the LOAD command.

LOAD **<Line Number> <File Number> <LOAD Type> <# Blocks>**
Input commands and parameters from permanent storage locations specified by the FILES command.

RETURN **--**
Return to the source of input which was being used when the last LOAD command was encountered. It has no parameters.

NEXTLINES **5*<Next Line of File>**
Enter the default next line to be accessed in each of the five files.

Commands to Control Program Execution

The following commands are used to direct program control. Typically, these commands are used within "control" files to execute a series of program steps.

STOP **<Next Program>**
Stop running the current program and optionally run a new program.

REPEAT **<Variable Name> <First Val> <Last Val> <Increment>**
Initiate a loop in a control file so that the set of commands which follow will be repeated a finite number of times.

GOTO **<Destination>**
Divert the input stream within a file by providing the next location to be LOADed from that file.

CALCULATE **<Algebraic Expression>**
Perform a calculation for the given expression and optionally assign the integer result to a user variable.

CHAPTER 5

Advanced Procedures

Chapter 5 Topics

Chapters 1 through 4 covered the basic methods and commands required to use the PRESYNCHRO program to solve most problems which will be encountered. The advanced procedures discussed in this chapter can greatly increase efficiency in solving problems with PRESYNCHRO, as well as provide insights into how to use PRESYNCHRO to solve unusual problems. Before beginning this section, it is necessary to have a good understanding of the material covered in the previous chapters, as well as in the *TEAPAC Tutorial/ Reference Manual*. If this is not the case, please review this material prior to continuing. Chapter 5 of the *TEAPAC Tutorial/Reference Manual* can also be used to discover advanced procedures which can be used by PRESYNCHRO, as well as all TEAPAC programs.

Chapter 5 Topics

Chapter 5 Introduction
Sharing Data Files with Other TEAPAC Programs

Sharing Data Files with Other TEAPAC Programs

A major element in the design of TEAPAC programs is the ability to share both input and output data amongst any TEAPAC programs which can make valid use of the data. All TEAPAC application programs (except NOSTOP) use the same single data file which contains all data entries used by all programs. This includes intersection traffic and geometric data, network data, traffic count data and traffic generator data, whether or not this data is specifically germaine to the purpose of the specific program being used at the time. This means that all of this data can be shared amongst all TEAPAC programs by simply opening the one data file into the program desired, and saving the data, as appropriate, before moving to another program. The easiest way to accomplish this is by using the LinkTo menu which automatically closes the current program and opens the selected program with the same data file.

In the case where data changes within one program as a result of an analysis and these changes are needed for use in another program, the user need only save the changes in the file before opening the file in the next program. The LinkTo menu provides a simple way to transfer control

of the file to that next program (after saving) by simply selecting the next program. Examples of circumstances where this exchange of results might occur are illustrated below:

In SIGNAL2000

- Computed HCM-compliant SATURATIONFLOWS can be transferred to TEAPAC PREprocessors for use by PASSER, TRANSYT, CORSIM, SYNCHRO or TSPPD.
- HCM-optimized SEQUENCES, GREENTIMES and YELLOWTIMES can be transferred to TEAPAC PREprocessors for use by NOSTOP, PASSER, TRANSYT, CORSIM, SYNCHRO or TSPPD for various forms of coordinated operation assessment and/or optimization.

In PREprocessors

- Imported optimized OFFSETS (and possibly GREENTIMES) can be transferred to SIGNAL2000 or other TEAPAC PREprocessors for evaluation, graphical rendition, simulation, animation or further optimization.

In TURNS/WARRANTS

- Peak 15-minute or 60-minute VOLUMES (and possibly TRUCKPERCENTS and PEAKHOURFACTORS) can be transferred to SIGNAL2000 for HCM-compliant capacity analysis, HCM phasing/timing optimization or intersection design.
- Peak 15-minute or 60-minute VOLUMES (and possibly TRUCKPERCENTS and PEAKHOURFACTORS) can be transferred to TEAPAC PREprocessors for use by PASSER, TRANSYT, CORSIM, SYNCHRO or TSPPD.
- Peak 15-minute or 60-minute VOLUMES can be transferred to SITE as background traffic for traffic impact analysis studies.

In SITE

- Projected added volumes (VOLADDITIONALS) can be transferred to SIGNAL2000 for HCM-compliant capacity analysis, HCM phasing/timing optimization or intersection design.
- Projected added volumes (VOLADDITIONALS) can be transferred to TEAPAC PREprocessors for use by PASSER, TRANSYT, CORSIM, SYNCHRO or TSPPD.

Traffic volumes are an important element either determined by or used by virtually all modules of TEAPAC, thus a discussion here of how volume information flows among all the TEAPAC programs will be helpful. Analysis volumes in any TEAPAC program are the additive combination of VOLUMES and VOLADDITIONALS entries. Thus, for any given movement, the VOLUMES entry for that movement is added to the VOLADDITIONALS entry for that movement to arrive at the analysis volume for that movement. For added flexibility, VOLUMES entries can be factored up or down by corresponding VOLFACTORS entries (with the additional possibility of compounded growth applied to those factors) and VOLADDITONALS entries can be factored up or down by a separate factor. Normally, VOLUMES will be either entered by the user or set automatically by peak period analysis in TURNS or WARRANTS (consistent with the then-current VOLFACTORS entries). Normally, VOLADDITIONALS will be either entered by the user or set automatically by traffic generation computations in SITE (consistent with the then-current VOLUMES and VOLFACTORS entries). The user is directed to the specific formulas for analysis volume determination described in detail in Appendix C.

The following discussion provides further program-specific notes about data file sharing for this program.

Sharing Data with SIGNAL2000, PRENOSTOP, PREPASSR, PRETRANSYT, PRETSPPD and PRENETSIM
Input Data from TURNS, WARRANTS and SITE

Sharing Data with SIGNAL2000, PRENOSTOP, PREPASSR, PRETRANSYT, PRETSPPD and PRENETSIM

SIGNAL2000 can provide a number of relevant analyses for typical arterial and network signal timing studies with SYNCHRO. For existing conditions, SIGNAL2000 can provide a complete and comprehensive capacity analysis strictly according to the methods of the *2000 Highway Capacity Manual* (HCM). When optimizing the signal timings of each signal in an arterial, SIGNAL2000 will consider HCM level of service, virtually every possible phasing combination, for both the major street and the cross street, and will completely consider the effects which right turns, clearance intervals and minimums have on the best timings. Each of these optimized conditions can be SAVEd with SIGNAL2000, and then PRESYNCHRO can be run using all of these results without any re-entry of data. This virtually eliminates any input at all to PRESYNCHRO, using all of the data already entered and optimized from SIGNAL2000.

Since the data inputs and file information for SIGNAL2000, PRENOSTOP, PREPASSR, PRETRANSYT, PRETSPPD, PRESYNCHRO and PRENETSIM are identical, files which are opened and saved with PRESYNCHRO can be opened directly with all the others using the File-Open menu, allowing the immediate use of the SIGNAL2000 HCM capacity analysis and HCM delay optimization program, the NOSTOP bandwidth optimization program, the PASSER bandwidth optimization program, the TRANSYT simulation/optimization program, the TSPPD time-space platoon progression diagram program, the SYNCHRO simulation/optimization program and the NETSIM simulation and animation program for the data previously input to PRESYNCHRO. The most convenient way to move among all of these programs is to use the LinkTo menu provided in each program. This gives access to each of the SIGNAL2000, NOSTOP, PASSER-II, TRANSYT, TSPPD, SYNCHRO and NETSIM programs from a single data base.

If optimized intersection results from SIGNAL2000 are to be used by PRESYNCHRO, these results should be SAVEd after they are computed. Also, if SIGNAL2000's SATURATIONFLOWS are to be used by PRESYNCHRO, they must be SAVEd after an action command such as ANALYZE or SERVICEVOLS computes them.

In another joint use scenario, a common effort is to use the optimized results of SYNCHRO as a starting point for a TRANSYT optimization. In order to accomplish this easily, the SYNCHRO results should be imported into PRESYNCHRO and all info then SAVEd. This file can be transferred directly to PRETRANSYT using the LinkTo menu and EXPORTed immediately to TRANSYT.

Input Data from TURNS, WARRANTS and SITE

TURNS (and WARRANTS) is another program which can provide useful results for PRESYNCHRO (as well as SIGNAL2000). After the turning movement count summaries and peak-period analyses of TURNS are completed, the peak-period VOLUMES entries which are created are normally used as existing traffic volumes for the initial capacity analyses with SIGNAL2000 and demand volumes for PRESYNCHRO. The VOLUMES results of the TURNS peak-period analyses can be saved directly to the data file which can then be read by both SIGNAL2000 and PRESYNCHRO for these purposes. Note also that these VOLUMES can be easily factored by using the individual VOLFACTORS entries, as well as the global entry of VOLFACTORS when intersection 0 (all intersections) is selected.

The SITE program can be used in exactly the same manner as TURNS, creating a set of projected VOLADDITIONALS in the file, allowing a duplicate analysis to be performed on projected volumes, as well as existing volumes. Note also that these VOLADDITIONALS can be easily factored by using the individual VOLADDITIONALS factor entry, as well as the global entry of the factor when intersection 0 (all intersections) is selected. Another use of the factor, including its global entry, is to disable the VOLADDITIONALS by using a factor of 0.

APPENDICES

Reference Manual

The following appendices form the PRESYNCHRO Reference Manual. This manual is designed to provide detailed information regarding various aspects of the PRESYNCHRO program. The information in the appendices is ordered such that easy reference access is possible. Each of the appendices is described briefly below.

Appendix A
ABBREVIATED DESCRIPTION OF ACTIONS AND ENTRIES

Appendix A lists all PRESYNCHRO commands by group name. This appendix is designed for quick reference regarding group names and command hierarchy. The single line descriptions are identical to the descriptions provided by the Help-Commands menu and the HELP command. The descriptions identify the names and number of parameter values along with any default values.

Appendix B
DETAILED DESCRIPTION OF ACTIONS AND ENTRIES

Appendix B provides complete detail regarding the PRESYNCHRO commands and their associated parameter values. All PRESYNCHRO commands are listed in this section. Five categories of information are provided for each command: 1) Format, 2) Function, 3) Parameters, 4) Group Names and 5) Notes. This appendix provides specific details on how to use a PRESYNCHRO command and what, if any, limitations exist on the associated parameter values. The Note category provides useful "hints" on the use of the command.

Appendix C
ANALYSIS METHODS AND FORMULATIONS

Appendix C discusses the methods and formulae used by the PRESYNCHRO program to calculate results. Using the procedures discussed in this appendix, it is possible to manually recreate the results calculated by PRESYNCHRO.

Appendix D
REPORT DESCRIPTIONS AND EXAMPLES

Appendix D describes the reports generated by the PRESYNCHRO program. In addition, sample output is provided for each type of report generated by the PRESYNCHRO program. The elements of each report are described in detail.

Appendix E
ERROR MESSAGES AND TROUBLE SPOTS

Appendix E describes program specific error messages of the PRESYNCHRO program, the potential cause of such errors and potential solutions. PRESYNCHRO errors are identified by the letters "PSY" followed by a two-digit number. In addition, potential trouble spots associated with using the PRESYNCHRO program are outlined. This appendix is useful for identifying program-specific causes for certain problems in the use of PRESYNCHRO, as well as preventing future errors.

Appendix F
TEAPAC SYSTEM ERROR MESSAGES

Appendix F describes error messages which are common to all TEAPAC programs. TEAPAC error or warning messages are identified by the letters "TPC" followed by a two digit number. This appendix discusses each TEAPAC error and potential causes and solutions. Appendix F of each TEAPAC Manual is identical for quick reference purposes.

Appendix G
OPERATING SYSTEM MESSAGES AND INSTALLATION NOTES

Appendix G discusses the unique aspects of the installation of TEAPAC programs on a particular operating system. Operating system dependent functions such as error messages, file specification procedures and output control features are discussed. Special function keys, such as control characters, are also discussed. Appendix G of each TEAPAC Manual is identical for quick reference purposes.

Appendix H
ADDENDA

Appendix H provides a location for recent release notes and addenda which may be published after the official release of this documentation. This appendix can also be used to store printed copies of new release notes for updated versions of PRESYNCHRO, as produced by the Help-RecentChanges menu or the MESSAGES command, for off-line reference.

APPENDIX A

Abbreviated Description of Actions and Entries

Appendix A Topics

Appendix A is designed as a quick reference to the PRESYNCHRO commands and their associated parameter values. This appendix is also useful for identifying what specific Group Names exist in the PRESYNCHRO program (Table A-1), which commands can be found in each group (Table A-2), and an alphabetical list of commands (Table A-3). The command information contained in this appendix can be accessed interactively using the HELP command.

In Table A-1, the column labeled "Std Name" has an "X" entered for every group name that is a standard name found in each TEAPAC program. The name and meaning of these groups in each TEAPAC program is identical, allowing a quick understanding of how commands are organized in each TEAPAC program. The column labeled "Std Group" has an "X" entered for every group which is comprised of standard TEAPAC commands. In these cases, not only is the name of the group the same in every TEAPAC program, but the names and purposes of the commands in the groups are also identical among TEAPAC programs, further enhancing the quick understanding of commands in each TEAPAC program.

Group names are useful when using a command which requires a list of commands as a parameter value. These are the RESET, ASK, DATA, HELP and SAVE commands. Group names make it possible to list a complete set of commands using a single parameter value. In order to use a group name as a parameter value, it is necessary to enclose the group name in square brackets, "[XXX]", as shown in this appendix.

Table A-1
Group Name Structure

[GROUP NAME] – Types of Commands Included in Group	Std Name	Std Group
[ALL] – All of the PRESYNCHRO commands, alphabetically	X	
[INFO] – help & information about updates	X	X
[DATAFILES] – data and file management	X	X
[TITLES] – enter the headings for report output	X	X
[CONTROL] – control program execution environment	X	X
[RESULTS] – perform program-specific actions	X	
[PARAMETERS] – enter program-specific data	X	
[BASIC] – enter essential data requirements	X	
[SYSTEM] – enter system data		
[INTERSECTION] – enter intersection data		
[SIGNAL2000] – enter additional intersection data		
[TURNS/WARRANTS] – enter traffic count data		
[SITE] – enter traffic generator data		
[EXPORT] – related to export-to-SYNCHRO actions		
[IMPORT] – related to import-from-SYNCHRO actions		

Appendix A Topics

Appendix A Introduction
PRESYNCHRO Command Structure
All Commands

PRESYNCHRO Command Structure

Each PRESYNCHRO command has been classified into one or more "groups", each of which consist of a subset of all PRESYNCHRO commands. Each group contains commands which share functional similarities. The Group Name associated with each group describes the function shared by the commands. The Group Names form a heirarchical command structure, as outlined in Table A-1. Group names are either common names used in all TEAPAC programs, or special names used by the PRESYNCHRO program, as described in the following sections.

Table A-2 provides a cross-reference between each of the commands and the group names. Abbreviated group names appear across the top of the table and commands along the left side.

An "X" in the table indicates that the command to the left is included in the group name above. This table allows a quick view of the relationship between group names and commands.

Common TEAPAC Group Names
Special PRESYNCHRO Group Names

Table A-2
Cross-Reference of Commands and Groups

Command	Groups: ALL	INF	DAT	TIT	CON	RES	PAR	BAS	SYS	INT	SIG	TUR	SIT	EXP	IMP
MESSAGES	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
HELP	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
RESET	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
DATA	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
SUMMARISE	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
FILES	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
NEXTLINES	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
ECHO	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
LOAD	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
SAVE	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
ASK	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
PROJECT	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.
DESCRIPTION	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.
NOTE	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.
STOP	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
IODEVICES	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
NEWPAGE	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
HEADING	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
CALCULATE	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
REPEAT	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
GOTO	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
RETURN	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
EXPORT	X	.	.	.	.	X	.	.	.	.	.	.	.	X	.
IMPORT	X	.	.	.	.	X	.	.	.	.	.	.	.	.	X
PLOT	X	.	.	.	.	X	.	.	.	.	.	.	.	.	X
TIMINGS	X	.	.	.	.	X	.	.	.	.	.	.	.	.	X
NODELIST	X	.	.	.	.	.	X	X	X	.	.	.	.	.	.
SUBSYSTEM	X	.	.	.	.	.	X	.	X	.	.	.	.	X	.
ROUTE	X	.	.	.	.	.	X	.	X	.	.	.	.	X	.
MASTERNODE	X	.	.	.	.	.	X	.	X	.	.	.	.	X	.
QUEUEMODELS	X	.	.	.	.	.	X	.	X	.	.	.	.	.	.
SIMULATION	X	.	.	.	.	.	X	.	X	.	.	.	.	.	.
OPTIMIZE	X	.	.	.	.	.	X	X	X	.	.	.	.	X	.
OUTPUT	X	.	.	.	.	.	X	.	X	.	.	.	.	X	.
LINKLIST	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.
INTERSECTION	X	.	.	.	.	.	X	X	.	X	.	.	.	.	X
NODELOCATION	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
NETWORK	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
APPLABELS	X	.	.	.	.	.	X	.	.	X	X	.	.	.	.
MOVLABELS	X	.	.	.	.	.	X	.	.	X	X	.	.	.	.
RIGHTTURNONREDS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
VOLUMES	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
VOLFACTORS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
VOLADDITIONALS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
WIDTHS	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
LANES	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
GROUPTYPES	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
TRUCKPERCENTS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
PEAKHOURFACTORS	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.

Table A-2 (continued)
Cross-Reference of Commands and Groups

Command	Groups: ALL	INF	DAT	TIT	CON	RES	PAR	BAS	SYS	INT	SIG	TUR	SIT	EXP	IMP
ACTUATIONS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
MINIMUMS	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
STARTUPLOST	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
ENDGAIN	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
STORAGE	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
SATURATIONFLOWS	X	.	.	.	.	.	X	X	.	X	.	.	.	.	.
SEQUENCES	X	.	.	.	.	.	X	X	.	X	.	.	.	.	X
PERMISSIVES	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
OVERLAPS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
LEADLAGS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	X
CYCLES	X	.	.	.	.	.	X	X	.	X	.	.	.	.	X
GREENTIMES	X	.	.	.	.	.	X	X	.	X	.	.	.	.	X
YELLOWTIMES	X	.	.	.	.	.	X	X	.	X	.	.	.	.	X
OFFSET	X	.	.	.	.	.	X	X	.	X	.	.	.	.	X
PHASEMOVEMENTS	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.
METROAREA	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
LEVELOFSERVICE	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
EXCESS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
GRADES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
PEDLEVELS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
BIKEVOLUMES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
PARKINGSIDES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
PARKVOLUMES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
BUSVOLUMES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
UPSTREAMVC	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
UTILIZATIONS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
ARRIVALTYPES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
REQCLEARANCES	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
INITIALQUEUE	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
IDEALSATFLOWS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
FACTORS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
DELAYFACTORS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
NSTOPFACTORS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
CRITICALS	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
PEDTIME	X	.	.	.	.	.	X	.	.	.	X	.	.	.	.
COUNTTYPE	X	.	.	.	.	.	X	.	.	.	.	X	.	.	.
PERIODS	X	.	.	.	.	.	X	.	.	.	.	X	.	.	.
CONDITIONS	X	.	.	.	.	.	X	.	.	.	.	X	.	.	.
ADTFACTOR	X	.	.	.	.	.	X	.	.	.	.	X	.	.	.
VEHICLECOUNTS	X	.	.	.	.	.	X	.	.	.	.	X	.	.	.
TRUCKCOUNTS	X	.	.	.	.	.	X	.	.	.	.	X	.	.	.
SITESIZE	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.
ROUND	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.
BASE	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.
GENERATION	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.
PATHDISTRIBUTION	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.
PATHASSIGNMENT	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.
ASSIGNMENT	X	.	.	.	.	.	X	.	.	.	.	.	X	.	.

Common TEAPAC Group Names

The group name [ALL] contains every possible PRESYNCHRO command. This group is organized in alphabetical order. The [ALL] group is divided into six sub-groups, all of which have standard group names used in every TEAPAC program. These are [INFO], [DATAFILES], [TITLES], [CONTROL], [RESULTS], and [PARAMETERS]. The first four encompass the 22 standard TEAPAC commands found in every TEAPAC program. These are used primarily for the basic housekeeping chores needed for program manipulation, such as on-screen help, data manipulation, file handling, output labeling, printer control, and control file actions. The last two sub-groups contain commands specific to the PRESYNCHRO program. The first, [RESULTS], consists of active commands which produce specific PRESYNCHRO results. The other, [PARAMETERS], consists of all of the commands which can be used to enter the data values which describe the scenarios to be analyzed by the [RESULTS] commands.

The [PARAMETERS] group has another standard TEAPAC group name as its sub-set. This is the [BASIC] group, which consists of those important and necessary [PARAMETERS] commands needed as a minimum to describe the data for an analysis. In the PRESYNCHRO program, since the [PARAMETERS] group is quite large, it is further sub-divided into additional special groups as described below.

Special PRESYNCHRO Group Names

The PRESYNCHRO program contains seven special group names, five of which are subsets of the [PARAMETERS] group. The subset groups are [SYSTEM], [INTERSECTION], [SIGNAL2000], [TURNS/WARRANTS] and [SITE]. The [SYSTEM] commands are used to enter those parameters which set up the network to be studied, while the [INTERSECTION] commands are used to input those parameters which affect each individual intersection. The [SIGNAL2000], [TURNS/WARRANTS] and [SITE] commands are used to enter those parameters which are needed only by SIGNAL2000, TURNS, WARRANTS and SITE -- these are present for seamless data file compatibility with these programs using the LinkTo menu.

The other two special group names are for actions which relate to exporting PRESYNCHRO data to SYNCHRO and to importing the results of SYNCHRO back into PRESYNCHRO. These are called [EXPORT] and [IMPORT], respectively. These special group names are best used with the ASK command from the Manual Mode to generate helpful sequences of command dialogs for the activities described above.

All Commands

Table A-3
All Commands Listed Alphabetically

Command	Parameter Values	Defaults
ACTUATIONS	12*<Actuated Phase - NO/YES>	12*NO
ADTFACTOR	<Factor to Expand Counts to 24 Hour Volumes>	0.0
APPLABELS	4*<1-character Approach Label>	N,E,S,W
ARRIVALTYPES	12*<Arrival Type - 1/2/3/4/5/6; PVG; or RP>	12*3
ASK	<List of Commands>	[PARAM]
ASSIGNMENT	<Type#> <Int#> 12*<<Mov#> <Asgn Fctr (%)>>	- - - 12*0
BASE	<Dev Size> <LL X,Y Coord> <UR X,Y Coord>	0 0 0 0 0
BIKEVOLUMES	4*<Conflicting Bicycles (bikes/hr)>	4*0
BUSVOLUMES	4*<Stopping Bus Volume (bus/hr)>	4*0
CALCULATE	<Algebraic Expression>	-
CONDITIONS	<MjDr> <LnNS> <LnEW> <SPD> <POP> <PRG> <REM> 2*<<Acc> <Dly>>	
COUNTTYPE	<Count Type - CUM/RED> <Truck Type - INC/SEP>	RED INC
CRITICALS	6*<Critical Movement Number>	6*0
CYCLES	<Cycle Length (sec)> <Cycle Max> <Cycle Inc>	60 120 30
DATA	<List of Commands>	[PARAM]
DELAYFACTORS	12*<Delay Adjustment Factor>	12*1.00
DESCRIPTION	<Second Title Line>	blanks
ECHO	<Input/Output Echo Condition - NO/YES>	NO
ENDGAIN	12*<End Gain Time (sec)>	12*2.0
EXCESS	<List of Priority Movement #'s>	0
EXPORT	<File>/AUTO/STACK <NO/YES> <VIEW/IMPRT/BOTH>	AUTO NO IMP
FACTORS	12*<Capacity Adjustment Factor>	12*1.00
FILES	5*<File Name>	5*blanks
GENERATION	<IN/OUT/BOTH> <Gen Rate> 10*<Node-Dir>	- 0.0 10*(0-)
GOTO	<Line #>/<Repeat Variable>	next
GRADES	4*<Grade of Approach (%)>	4*0.0
GREENTIMES	6*<Phase Green Time (sec or sec/sec)>	6*0.0
GROUPTYPES	12*<Lane Group - NORM/FREEFL/DUALOPT/STP/YLD>	12*NORMAL
HEADING	<Number of Lines>	3
HELP	<List of Commands>	[PARAM]
IDEALSATFLOWS	12*<Ideal Saturation Flow Rate (pcphgpl)>	12*1900
IMPORT	<SYNCHRO Output File>/AUTO <Display-NO/YES>	AUTO NO
INITIALQUEUE	12*<Initial Queue (veh)>	12*0
INTERSECTION	<Node #> <Intersection Description>	0 blanks
IODEVICES	<View - NORM/TABL> <Page #> <Ln/Pg> <Lst Ln>	Norm 0 66 63
LANES	12*<Number of Lanes>	12*0
LEADLAGS	2*<Lead-Lag Phasing - NONE/LEAD/LAG>	2*NONE
LEVELOFSERVICE	<Delay1> <Delay2> <Delay3> <vc1> <vc2> <vc3>	C E 5 90 100 5
LINKLIST	500*<<Node #> N/E/S/W>	500*0
LOAD	<Line #> <File #> <PROCESS/SHARE/IGNORE> <#>	next next P 1
MASTERNODE	<Master Node #>	0
MESSAGES	<Level - 0/1/2/3>	3
METROAREA	<Location - CBD/NON-CBD>	NON-CBD
MINIMUMS	12*<Minimum Green Time (sec)>	12*5.0
MOVLABELS	12*<2-character Movement Label>	RT,TH,LT
NETWORK	N/E/S/W <Dist> <Speed> <Node #> 4*<Mov #>	-
NEWPAGE	<Page Advance - NO/YES>	YES
NEXTLINES	5*<Next Line of File>	5*0
NODELIST	100*<Node # in Optimization Order>	100*0
NODELOCATION	<X Coordinate> <Y Coordinate>	0 0
NOTE	<Third Title Line>	blanks

Table A-3
All Commands Listed Alphabetically

Command	Parameter Values	Defaults
NSTOPFACTORS	12*<Stops Adjustment Factor>	12*1.00
OFFSET	<Phase Offset (sec/sec)> <Phase #>	0.0 1
OPTIMIZE	NONE/OFFSTS/SPLTS+OFFS/CYCLE/LIST 15*<Steps>	NONE 15*0
OUTPUT	<Prog>	PSY
OVERLAPS	4*<Rt Turn Overlap - NO/YES>	4*YES
PARKINGSIDES	4*<Location - NONE/RIGHT/LEFT/BOTH>	4*NONE
PARKVOLUMES	4*<Parking Volume (manuv/hr)>	4*20
PATHASSIGNMENT	<Path # (1-5)> <Asg %> <Node List - 16 max>	- - -
PATHDISTRIBUTION	<Typ #> <Distr %> <Node #> <Dir-N/E/S/W> <Desc>	- 0 0 - -
PEAKHOURFACTORS	12*<Peak Hour Factor>	12*0.90
PEDLEVELS	4*<Pedestrian Interference (ped/hr)>	4*0
PEDTIME	<Exclusive Ped-phase Time (sec)> <Phase #>	0.0 0
PERIODS	<Count Interval> 5*<<Start Time> <Stop Time>>	15 - -
PERMISSIVES	4*<Permissive Left - NO/YES>	4*NO
PHASEMOVEMENTS	<Phase #> <List of Movements>	-
PLOT	<Scale (ft/line)> <Node List>	0 nodelist
PROJECT	<First Title Line>	blanks
QUEUEMODELS	<Model #> <Percentile> <Auto (ft)> <Trk (ft)>	1 90 25 40
REPEAT	<Variable> <Start> <End> <Increment>	- 1 1 1
REQCLEARANCES	12*<Required Clearance (sec)>	12*4.0
RESET	<List of Commands>	[PARAM]
RETURN	-	-
RIGHTTURNONREDS	4*<Right Turn on Red Volume (vph)>	4*0
ROUND	<Precision of Totals (Veh)>	1
ROUTE	<Route #> <List of Node #s>	- 25*0
SATURATIONFLOWS	12*<Lane Group Saturation Flow (vphg)>	12*0
SAVE	<Line #> <File #> <List of Commands>	nxt nxt [P]
SEQUENCES	<Sequence Code>	0
SIMULATION	<Steps/Cycle> <Min Simul> <Stop Pen> <Links>	60 15 -1 TEAPC
SITESIZE	<# Distribution Types> <# Inbound Types>	0 0
STARTUPLOST	12*<Startup Lost Time (sec)>	12*2.0
STOP	<Program Name>	-
STORAGE	12*<Storage Distance (feet)>	12*0
SUBSYSTEM	100*<Node # of Subsystem>	100*0
SUMMARISE	-	-
TIMINGS	<Node List>	nodelist
TRUCKCOUNTS	<Movement #>/<Time> <List of Counts>	0
TRUCKPERCENTS	12*<Truck-Thru Bus Percentage (%)>	12*2.0
UPSTREAMVC	4*<Upstream v/c Ratio>	4*0.0
UTILIZATIONS	12*<Lane Utilization Factor>	12*0.0
VEHICLECOUNTS	<Movement #>/<Time> <List of Counts>	0
VOLADDITIONALS	<Factor> 12*<Additional Volume>	1.0 12*0
VOLFACTORS	<# Years> 12*<Count Adjustment Factor>	1 12*1.00
VOLUMES	12*<Design Hour Volume (veh/hr)>	12*0
WIDTHS	12*<Lane Group Width (feet)>	12*0
YELLOWTIMES	6*<Phase Yellow Time (sec or sec/sec)>	6*0.0

APPENDIX B

Detailed Description of Actions and Entries

Appendix B Topics

Appendix B provides detailed information on each PRESYNCHRO command and any associated parameter values. The commands are listed in alphabetical order. This appendix includes the 22 basic TEAPAC commands as well as the unique PRESYNCHRO commands. Five specific categories of information are provided for each command, as described below:

COMMAND	**<Parameter Name>**	**5*<Another Parameter>**
Defaults:	[default for <Parameter Name>]	5*[default for <Another Parameter>]
Menus/Groups:	[<menu/group name>]	

This section shows the proper usage format of the command, including the parameter values and their order of input. The command is in capital letters and parameter names are in angle brackets, "< " and ">". An integer followed by an asterisk, "*", indicates that the parameter can be repeated the specified number of times (five times in the example).

Below the command line, each of the default values for each parameter is shown, followed by a list of any menu/group names to which the command belongs, other than [ALL]. This is followed by a description of the purpose of the command.

For each parameter listed, a separate paragraph provides a complete description of the parameter, its allowed values and its default value.

All of the parameters descriptions are followed by a section of Notes which describe any special information, warnings and other "hints" to insure the proper use of the command.

Appendix B Topics

Appendix B Introduction
Alphabetical List of Commands

Alphabetical List of Commands

Commands:

ACTUATIONS
ADTFACTOR
APPLABELS
ARRIVALTYPES
ASK
ASSIGNMENT
BASE
BIKEVOLUMES
BUSVOLUMES
CALCULATE
CONDITIONS
COUNTTYPE
CRITICALS
CYCLES
DATA
DELAYFACTORS
DESCRIPTION
ECHO
ENDGAIN
EXCESS
EXPORT
FACTORS
FILES
GENERATION
GOTO
GRADES
GREENTIMES
GROUPTYPES
HEADING
HELP
IDEALSATFLOWS
IMPORT
INITIALQUEUE
INTERSECTION
IODEVICES
LANES
LEADLAGS
LEVELOFSERVICE
LINKLIST
LOAD
MASTERNODE
MESSAGES

METROAREA
MINIMUMS
MOVLABELS
NETWORK
NEWPAGE
NEXTLINES
NODELIST
NODELOCATION
NOTE
NSTOPFACTORS
OFFSET
OPTIMIZE
OUTPUT
OVERLAPS
PARKINGSIDES
PARKVOLUMES
PATHASSIGNMENT
PATHDISTRIBUTION
PEAKHOURFACTORS
PEDLEVELS
PEDTIME
PERIODS
PERMISSIVES
PHASEMOVEMENTS
PLOT
PROJECT
QUEUEMODELS
REPEAT
REQCLEARANCES
RESET
RETURN
RIGHTTURNONREDS
ROUND
ROUTE
SATURATIONFLOWS
SAVE
SEQUENCES
SIMULATION
SITESIZE
STARTUPLOST
STOP
STORAGE
SUBSYSTEM
SUMMARISE
TIMINGS

TRUCKCOUNTS
TRUCKPERCENTS
UPSTREAMVC
UTILIZATIONS
VEHICLECOUNTS
VOLADDITIONALS
VOLFACTORS
VOLUMES
WIDTHS
YELLOWTIMES

ACTUATIONS 12*<Actuated Movement>

Defaults: 12*NO
Menus/Groups: [PARAMETERS] [INTERSECTION]

The purpose of this command is to enter the type of phase module present, actuated or non-actuated, for each movement of the current intersection.

<Actuated Movement> is a keyword describing whether or not the movement is part of an actuated phase, as described below:

NO	the movement is not part of an actuated phase (default).
YES	the movement is part of an actuated phase.

Notes

- Specifying YES for all non-zero lane groups indicates a fully actuated signal. Specifying NO for all non-zero lane groups indicates a pretimed signal. Specifying YES for some, but not all, non-zero lane groups indicates a semiactuated signal.

ADTFACTOR <Factor to Expand Counts to 24 Hour Volumes>

Defaults: 0.0
Menus/Groups: [PARAMETERS] [TURNS/WARRANTS]

The purpose of this command is to enter a factor which will be used to estimate 24-hour volumes from partial day's counts.

<Factor to Expand Counts to 24 Hour Volumes> is a factor which, when multiplied by the entire counted traffic, will produce a reasonable estimate of 24-hour traffic volumes, or average daily traffic (ADT). It can be any decimal number from 0.0 to 100.0. Its default value is 0.0.

Notes

- The single factor entered on the ADTFACTOR command is used in Usage Level 2 of WARRANTS to multiply the total counted volume of each movement to estimate the 24-hour volume of each movement. This 24-Hour Volume Estimates report is produced at the end of the ANALYZE outputs when the default ANALYZE command is used. It is not produced if a specific time range is selected for the ANALYZE command. The REPORTS command can also be used to produce the 24-Hour report using the ADT option in the list of reports.

- When the ADTFACTOR is zero, the default value, the 24-Hour Volume Estimates report is omitted under all conditions.

APPLABELS 4*<Approach Label>

Defaults: N E S W
Menus/Groups: [PARAMETERS] [INTERSECTION] [SIGNAL2000]

The purpose of this command is to enter labels for each approach of the current intersection.

<Approach Label> is a two-character abbreviation for each of the four approaches at the intersection, and can be any two characters. Its default value is N, E, S, & W for each of the approaches, respectively.

Notes

- Alternate labels could be, for example, SB, WB, NB, & EB, respectively, or A, B, C, & D.

- Use of APPLABELS does not change the order of entry -- this order is always clockwise starting with the north approach. APPLABELS merely allows each approach to be labeled with the user's choice of characters.

ARRIVALTYPES 12*<Quality of Progression>

Defaults: 12*3
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the quality of progression for each movement of the current intersection (for SIGNAL2000 file compatibility only).

<Quality of Progression> specifies various types of parameters related to the quality of progression for use in the determination of the Delay Adjustment Factor, and can take on values in the ranges described below:

0 <= Value <= 6	indicates the actual Arrival Type.
7 <= Value <= 300	indicates the value entered is the percentage of platoon ratio (RP).
-100 <= Value <= -1	indicates the value entered is the negative of the percentage of all vehicles in the movement arriving during the green phase (PVG).

Its default value is 3 for all movements.

Notes

- ARRIVALTYPES is used for computing the Progression Adjustment Factor according to Exhibit 16-12 of the 2000 *Highway Capacity Manual*.
- For RP values less than or equal to 6%, use Arrival Type 1.
- If the value is entered as either PVG or RP, the program will determine the arrival type based on the method outlined in the 2000 *Highway Capacity Manual*. Values 1 through 6 are defined as in Exhibit 16-11 of the manual.
- An ARRIVALTYPE value other than 3 may be used for a movement with ACTUATIONS set to something other than NO, but only where it is clear that the coordinated movement is truly actuated when it is also coordinated.
- Note that although many intersections in a network may be entered into SIGNAL2000, the arrival type is a user entry and is not determined by the program based on flows from other intersections in the network.

ASK <List of Commands>

Defaults: [PARAMETERS]
Menus/Groups: [DATAFILES]

The purpose of this command is to produce a dialog box display for each of the listed commands.

<List of Commands> is a set of commands and/or group names, and can be any valid commands or group names of the program. Its default value is [PARAMETERS] - all nonactive commands for entry of parameters related to the analysis procedures.

Notes

- The ASK command will prompt the user for entry of parameter values for each of the commands in the list. An input dialog for each command (Normal View) or the entire list (Tabular View) will be initiated showing the current DATA values and a line of HELP at the bottom of the dialog.

- When a correctable error is detected in the parameter list of any command entered from the Manual Mode, the ASK command is automatically performed for that command in order to allow re-entry of the parameter(s) in error.

- ASK may only be used from the Manual Mode. It is a powerful way to review current data values and to allow any necessary changes to be made simultaneously. It can also be used to create custom input and action sequence displays.

ASSIGNMENT **<Type #> <Intersection #>**
12*<<Movement #> <Assignment Factor>>

Defaults:	-	-
	12*<0 0>	
Menus/Groups:	[PARAMETERS] [SITE]	

The purpose of this command is to enter the percentage of a distribution type to be assigned to the movements at an intersection. This is only used to define special assignment situations, and is not normally used for typical site traffic assignment situations.

<Type #> is the number of the distribution type being assigned, and can be 1-150 (see note below). It has no default value, it must be entered.

<Intersection #> is the number of the intersection to which traffic is being assigned as defined on the INTERSECTION command, and can be 1-999 (see note below). It has no default value; it must be entered.

<Movement #> is the movement number to which the traffic is being assigned, and can be any integer from 0 to 12, as described below:

1-12 - one of the turning movements.
0 - designates that a list of assignments for all 12 movements will follow.

It has no default value; it must be entered.

<Assignment Factor> is the percentage of the traffic of the distribution type being assigned that is assigned to the specified movement, and can be 0-100 percent. Its default value is 0.

Notes

- The purpose of this command is to give the greatest degree of freedom in assigning traffic for a given distribution type to a given intersection. When this technique is used, SITE cannot check that the entered values are consistent with upstream and downstream assignments, as is the case when using the PATHASSIGNMENT command. As such, ASSIGNMENT should only be used in those rare instances when the PATHASSIGNMENT command cannot achieve the desired special-purpose assignment. It can also be used when using old SITE data files which were created before the PATHASSIGNMENT command was available.

- <Type#> may not exceed the limit previously set with the SITESIZE command, and <Intersection #> must represent a node included in the NODELIST command.

- Movement numbers begin with the north leg right-turn as movement number 1, and proceed clockwise around the intersection to movement number 12.

- Multiple pairs of movement numbers and their associated assignment factors may be entered on one ASSIGNMENT command. They should be entered one after the other at the end of the ASSIGNMENT command.

BASE	**<Generation Base>**	**<X-Y Coord LL>**	**<X-Y Coord UR>**
Defaults:	0	0 0	0 0
Menus/Groups:	[PARAMETERS] [SITE]		

The purpose of this command is to enter the base development size for generating trips as it relates to the generation rates used for the development.

<Generation Base> is the base development size to which the traffic generation rates are applied, and can be any integer from -9999 to 32767. Its default value is 0.

<X-Y Coord LL> are the X and Y coordinates of the lower-left (southwest) corner of the site for display in the schematic diagram, and can be any common coordinate system value, as an integer from -2,147,483,647 to 2,147,483,647. Its default value is 0,0.

<X-Y Coord UR> are the X and Y coordinates of the upper-right (northeast) corner of the site for display in the schematic diagram, and can be any common coordinate system value, as an integer from -2,147,483,647 to 2,147,483,647. Its default value is 0,0.

Notes

- The coordinate system used for BASE should match that used by each NODELOCATION command.

BIKEVOLUMES 4*<Conflicting Bicycles>

Defaults: 4*0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the volume of conflicting bicycles for right turns on each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Conflicting Bicycles> is the volume of conflicting bicycles, in bikes per hour, for right turns on the approach, and can be any integer from 0 to 2000. Its default value is 0.

Notes

- Entries for bicycle interference should be made for the approach from which the conflicting right turn is made. For example, bicycles crossing the east leg of the intersection interfere with right turns made from the south approach, so the <Conflicting Bicycles> value for that right turn should be input for the south approach.

BUSVOLUMES 4*<Stopping Bus Volume>

Defaults: 4*0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the volumes of stopping buses which stop on each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Stopping Bus Volume> is the hourly volume of local buses which stop at the bus stop designated for the approach, and can be any integer from 0 to 250. Its default value is 0, no stopping bus volume.

Notes

CALCULATE <Algebraic Expression>

Defaults: none
Menus/Groups: [CONTROL]

The purpose of this command is to perform a calculation for the given expression and optionally assign the integer result to a user variable.

<Algebraic Expression> is an expression in the form of an algebraic formula or equation, and can be any valid expression containing numeric constants, user variables and valid operators, as described below. It has no default value; it must be entered.

Notes

- The expression entered must be of the form of a normal algebraic expression using any of the four operators +, -, * and / (addition, subtraction, multiplication and division). This means that each operator must have two operands, one on either side of the operator. An operand may be either a numeric constant or one of the 26 1-character user variables A - Z. User variables must have had values assigned to them by a previous CALCULATE command or with a REPEAT command. A minus sign may also be used as a single operand operator to reverse the sign of the following constant or variable.

- Expressions are evaluated from left to right, except that multiplication and division operations always precede addition and subtraction. This order of precedence can be altered by surrounding parts of the expression which should be evaluated first with parentheses.

- If the result of the calculation is to be saved as the value of a user variable (A - Z), the single-character variable name should precede the expression and be separated from the expression with an equal sign, representing a normal algebraic equation. The value assigned to the variable will be rounded to the nearest integer, as described below.

- All internal calculations for the expression are made using 32-bit decimal arithmetic. The result is displayed in a format with four decimal places that can handle numbers less than 10 billion (1 x 10^10) and greater than -1 billion (-1 x 10^9). Regardless of the number of digits shown in the result, only 6-7 digits of accuracy exist; any other digits that are shown may be random.

- When a result is assigned to a user variable, the result is rounded to the nearest integer value. Results assigned to user variables must be less than or equal to 32,767 and greater than or equal to -32,768.

- If a variable is used in a calculation before its value has been assigned by a CALCULATE or REPEAT command, its value will be zero.

CONDITIONS **<Major Direction> <# N-S Lanes> <# E-W Lanes>**
<High Speed> <Low Population>
<Progression Impact> <Remedial Actions Failed>
<# Accidents for Signal> <Stop Sign Delay>
<# Accidents for Stop> <Minor Street Delay>

Defaults: NORTHSOUTH 1 1 NO NO NO NO 0 0 0 0
Menus/Groups: [PARAMETERS] [TURNS/WARRANTS]

The purpose of this command is to enter intersection conditions which affect the conduct of a Warrant Analysis at the current intersection.

<Major Direction> is a keyword which describes whether the major street is counted on the North-South approaches or East-West approaches. It can be any of the following:

NORTHSOUTH - major street counted on North & South approaches (default).
EASTWEST - major street counted on East & West approaches.

<# N-S Lanes> is the number of lanes for moving traffic on each of the North and South approaches. It can be any integer from 1 to 4. Its default value is 1.

<# E-W Lanes> is the number of lanes for moving traffic on each of the East and West approaches. It can be any integer from 1 to 4. Its default value is 1.

<High Speed> is a keyword which describes whether the 85th percentile speed of major street traffic exceeds 40 mph. It can be any of the following:

NO - major st. speeds don't exceed 40 (default).
YES - major street speeds exceed 40 mph.

<Low Population> is a keyword which describes whether the intersection is in an isolated community with a population less than 10,000. It can be any of the following:

NO - population is not less than 10,000 (default).
YES - population is less than 10,000.

<Progression Impact> is a keyword which describes whether a signal installation will not seriously disrupt progressive traffic flow. It can be any of the following:

NO - signal will disrupt progression (default).
YES - signal will not disrupt progression.

<Remedial Actions Failed> is a keyword which describes whether trials of less restrictive remedies have failed. It can be any of the following:

NO - other remedies have not failed (default).

YES - other remedies have failed.

<# Accidents for Signal> is the number of reported accidents, correctable by traffic signal control, within a 12-month period. It can be any integer number from 0 to 20. Its default value is 0.

<Stop Sign Delay> is the number of vehicle-hours of peak hour stop sign delay experienced by traffic on one minor approach of the intersection. It can be any integer from 0 to 20. Its default value is 0.

<# Accidents for Stop> is the number of reported accidents, correctable by multi-way stop control, within a 12-month period. It can be any integer number from 0 to 20. Its default value is 0.

<Minor Street Delay> is the average peak hour delay experienced by traffic on all minor approaches of the intersection in seconds/vehicle. It can be any integer from 0 to 300. Its default value is 0.

Notes

- The data entered for the CONDITIONS command are used by the WARRANTS command in WARRANTS and Usage Level 2 of TURNS to describe intersection conditions which affect the warrant levels and conditions which must be met to satisfy the warrants.

- <# N-S Lanes> and <# E-W Lanes> is the number of lanes for moving traffic on each of the North-South and East-West approaches, respectively, and normally does not include exclusive turn lanes. It is the number of lanes on each approach, not the total number of lanes on the street. If the actual number of lanes exceeds the maximum allowed entry of 4, enter 4 (the MUTCD only considers whether there is 1 lane or more than 1 lane).

COUNTTYPE <Type of Data> <Type of Truck Counts> <Count Description>

Defaults:	REDUCED	INCLUDED
	40 blanks	
Menus/Groups:	[PARAMETERS]	[TURNS/WARRANTS]

The purpose of this command is to enter the type of count data which is to be supplied to the program at the current intersection, and to provide a description of the count.

<Type of Data> is a keyword which defines the type of count data which will be entered on the VEHICLECOUNTS and TRUCKCOUNTS commands, and can be any of the following:

CUMULATIVE	The count data entered is the cumulation of traffic counted from the start of the survey.
REDUCED	The data entered is the actual volume counted for the count interval (default).

<Type of Truck Counts> is a keyword which defines the type of truck count data which will be entered on the VEHICLECOUNTS and TRUCKCOUNTS commands, and can be any of the following:

INCLUDED	VEHICLECOUNTS data includes truck counts entered with the TRUCKCOUNTS command (default).
SEPARATE	VEHICLECOUNT data does not include truck counts entered with the TRUCKCOUNTS command.

<Count Description> is a 40-character description of the count that was conducted, to include such things as the date, weather, count station, etc. The default value is all blanks.

Notes

- If entered data is declared CUMULATIVE, the data entered is the cumulation of traffic counted from the start of the survey, starting at an arbitrary value (sometimes 0). The actual volume will be the subtraction of successive cumulative entries. For REDUCED counts, the data entered is the actual volume counted for the count interval.

- When truck counts are INCLUDED, the truck counts entered with the TRUCKCOUNTS commands are also included in the VEHICLECOUNT data values and no adjustments are made by the program. When truck counts are declared SEPARATE, the truck counts entered with the TRUCKCOUNTS commands are not included in the VEHICLECOUNTS data values, so must be added to VEHICLECOUNTS by the program to get total traffic numbers.

CRITICALS 6*<Critical Movement Number>

Defaults: 6*0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the movement which is critical for each phase of the phase sequence of operation of the current intersection (for SIGNAL2000 file compatibility only).

<Critical Movement Number> is the movement number designating the movement which controls the design of the signal phase, and can be 0-12. Its default value is 0, no critical movement.

Notes

- Designation of a critical movement in any phase will result in that movement appearing with asterisks in the phase movement diagram. This is normally used to represent movements which were used to control a DESIGN. This diagram appears as part of the DIAGRAMS, ANALYZE, EVALUATE and QUEUECALCS reports. If a movement is designated as critical in any phase, the line for that movement in the ANALYZE report is flagged with an asterisk in the LOS column.

- The TIMINGS command automatically implements a CRITICAL command for the phases of the specified sequence which have been DESIGNed.

CYCLES	**<Minimum Cycle>**	**<Maximum Cycle>**	**<Cycle Increment>**		
Defaults:	40	140	5		
Menus/Groups:	[PARAMETERS]	[BASIC]	[INTERSECTION]	[EXPORT]	[IMPORT]

The purpose of this command is to enter the cycle length for the current intersection to be used for SYNCHRO's simulation or optimization, as well as a time-space plot or timing diagram.

<Minimum Cycle> is the length of the cycle, in seconds, or the minimum cycle of an optimization range, and can be any integer from 0 to 900. Its default value is 60 seconds.

<Maximum Cycle> is the largest cycle length, in seconds, which should be tested by a cycle optimization, and can be any positive integer equal to or larger than <Minimum Cycle>, from 0-900. Its default value is 120 seconds.

<Cycle Increment> is the precision to which the specified cycle length range will be optimized, i.e., the increment of cycle length which will be added to <Minimum Cycle> until <Maximum Cycle> is exceeded, and can be any positive integer from 0-900. Its default value is 30 seconds.

Notes

- <Minimum Cycle> is the cycle length which is used for PLOT and TIMINGS, and for SYNCHRO simulations.

- If signals at minor intersections in the system will be run at cycle lengths which are half that of the major intersections, commonly called "double-cycling", the system cycle length entered by the CYCLES entry for the MASTERNODE should be the longer cycle length used at the major intersections. The GREENTIMES and YELLOWTIMES for the double-cycled minor intersections should be entered in seconds (not sec/sec) and add up to half of the system cycle and the half-cycle should be entered for the minor intersections. OFFSETS should also be entered in seconds (not sec/sec).

- The system cycle length for coordinated systems will be equal to <Minimum Cycle> for the intersection referenced by MASTERNODE. If MASTERNODE is 0, <Minimum Cycle> for the first node in the NODELIST will be used as the system cycle.

DATA <List of Commands>

Defaults: [PARAMETERS]
Menus/Groups: [DATAFILES]

The purpose of this command is to display the current parameter values for the specified commands.

<List of Commands> is a set of commands and/or groups names, and can be any valid commands or group names of the program. It default value is [PARAMETERS] - all non-active commands for entry of parameters related to the analysis procedures.

Notes

- DATA will tabulate a list of the current parameter values of the listed commands. To obtain a formatted list of all data values with column headings and labels, etc., use the SUMMARISE command.

- In the Manual Mode of menu versions of TEAPAC programs, use of ASK for the same list of commands will display the current data values, as well as allow any input editing which may be needed, all in a single step.

DELAYFACTORS 12*<Delay Adjustment Factor>

Defaults: 12*1.00
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter factors for each movement of the current intersection used to adjust the delay calculations, for example, to match delays obtained from a network simulation model (for SIGNAL2000 file compatibility only).

<Delay Adjustment Factor> is the factor to adjust delay calculated for each movement, and can be any number from 0.01 to 9.99. Its default value is 1.00, no adjustment.

Notes

- If delay values have been simulated with a network model such as TRANSYT-7F or NETSIM/CORSIM which does a better job of modeling delay between coordinated signals than the 2000 *Highway Capacity Manual* allows, DELAYFACTORS may be used to force the calculations of delay in SIGNAL2000 to the same values. For example, if SIGNAL2000 calculates delay of 20 seconds, but TRANSYT7F estimates 16 seconds, use a DELAYFACTOR of 0.80.

DESCRIPTION <Second Title Line>

Defaults: 80 blanks
Menus/Groups: [TITLES]

The purpose of this command is to enter the second line of information used to identify the situation being analyzed.

<Second Title Line> is the second of three lines of information displayed at the top of every output report, and can be up to 80 characters of alphabetic or numeric information. Its default value is 80 blanks.

Notes

- If the first character of the DESCRIPTION parameter is a plus sign, "+", the characters entered on this command will be overlaid over those of the previously entered DESCRIPTION command. This overlay will begin at the character position identified by the digits of the first two characters which follow the "+", and will end after the last non-blank character which is entered. See Chapter 5 of the *TEAPAC Tutorial/Reference Manual* for further explanation and examples of this feature.

- Entries on this command may be enclosed in 'single quotes' or "double quotes". This option provides the capability to include leading blanks in the entry, which is otherwise not possible. This option can also be used to enter a single blank as the title line using a ' ' or " " entry, thereby blanking out the entire prior contents of the title line.

- The name of the current open file can be inserted anywhere in the title line by placing %F at the desired location of the title line. The file name can be placed at a specific column location in a title line by using the +XX form of a title entry noted above.

ECHO <Input/Output Echo Condition>

Defaults: NO
Menus/Groups: [DATAFILES]

The purpose of this command is to enter the echo condition flag indicating whether or not command information should be displayed after being input from or output to a file.

<Input/Output Echo Condition> is a keyword describing whether or not file input and output should be echoed, and can be either of the keywords described below.

NO	File I/O will not be echoed (default).
YES	File I/O will be echoed.

Notes

- When data is LOADed from or SAVEd to data files, listings of the actual data lines being transferred can be obtained by first setting the ECHO parameter to YES. This is a convenient way to visualize what is happening during LOADs and SAVEs. As such, it is also a powerful tool for debugging complicated batch control file sequences.

- ECHO can also be used to view some other file data transfer functions such as outputting volumes to files from TURNS and SITE for use by SIGNAL2000, etc.

ENDGAIN 12*<End Gain Time>

Defaults: 12*2.0
Menus/Groups: [PARAMETERS] [MOVEMENT]

The purpose of this command is to enter the length of time that vehicles effectively extend the green period into the yellow and all-red period for each of the twelve movements of the current intersection.

<End Gain Time> is the number of seconds during the yellow and all-red period which is effectively used as green time, and can be any number from 0.0 to 30.0. Its default value is 2.0.

Notes

- STARTUPLOST and ENDGAIN entries are now used to define an explicit amount of startup lost time and end gain time for each individual movement of each intersection. Their usage replaces the prior usage of the system-wide lost time value found on the LOSTTIMES entry, and permits better modeling of movement-specific conditions and consistency with the Highway Capacity Manual. These values are coded directly on the appropriate RT 29 entries.

- The default values of STARTUPLOST and ENDGAIN (both equal to 2 seconds) will be used unless otherwise changed by the user. This is particularly the case when an older data file is used in which a LOSTTIMES value in the file is found and ignored. The user should note that in these cases the resulting lostime value will be equal to the entered YELLOWTIME value. Since the prior default for LOSTTIMES was 3 seconds and it is not common to find a YELLOWTIME value of 3 seconds, the net result is that in these cases the lost time which results from default entries is likely to increase from prior analyses, resulting in reduced effective green time and likely increased delay.

EXCESS <List of Priority Movement Numbers>

Defaults: 0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the movements to which the TIMINGS command will assign available excess portions of the cycle length for the current intersection (for SIGNAL2000 file compatibility only).

<List of Priority Movement Numbers> is the movement numbers for the movements which should receive available excess time, and can be 0-12. Its default value is 0, no priority movements.

Notes

- For DESIGN, the <Target Delay/LOS> entry of the LEVELOFSERVICE command sets the target delay (or level of service) which is to be achieved for all critical movements of the intersection. If this target level is achieved with excess time still available at the intersection, then the excess time is assigned to the phases according to the entries on the EXCESS command. If no EXCESS entries have been made, time is allocated proportionally to all phases. However, if EXCESS is used, this provides a means to designate a worst-case delay/LOS performance level for all critical movements and to assign all additional time to the priority movements of the EXCESS command. This is the preferred optimization scheme for the DESIGN function of SIGNAL2000 (see Appendix C for more details).

- The excess time will be allocated to the phases in which the specified movements occur. If the movements specified occur in more than one phase, the excess time will be allocated to each in proportion to the g/C required by each.

- If a specified movement occurs in more than one phase, its excess time phase will be designated as the single phase serving the movement (i.e., if movement 2 is specified with sequence 21, the excess will go to the north-south through phase).

EXPORT	**<File/AUTO/STACK>**	**<Display Output>**	**<Auto Option>**
Defaults:	AUTO	NO	VIEW
Menus/Groups:	[RESULTS] [EXPORT]		

The purpose of this command is to create a SYNCHRO-compatible input data file from the current data values, with an optional automatic link to SYNCHRO.

<File/AUTO/STACK> is the name of the SYNCHRO input data file to EXPORT to, and can be any valid file name or the keywords AUTO or STACK. Its default value is AUTO.

<Display Output> is a keyword which describes if the EXPORTed data is to be displayed during the EXPORT process, and can be either NO or YES. Its default value is NO.

<Auto Option> is a keyword which describes what action should follow an automatic link to SYNCHRO. It can be any of the keywords listed below:

NONE	no further action.
VIEW	view SYNCHRO results onscreen (default).

Notes

- A problem has been discovered in the SYNCHRO Ver 7 1-file CSV format which is preventing accurate exporting of signal timings from PRESYNCHRO to SYNCHRO using this format. While this problem is researched by TrafficWare, a temporary workaround has been devised which circumvents the problem. After the 1-file Export to SYNCHRO is accomplished and with no intersections selected, the user should use the Transfer-DataAccess-Version6 menu in SYNCHRO to Read the _PHASING.CSV data file which is created as a part of the process which creates the 1-file CSV file for SYNCHRO Ver 7. This file has a prefix name which matches the name of the 1-file CSV file -- for example, by default Export Auto creates a file called TMPSYN.CSV and the additional file to read is called TMPSYN_PHASING.CSV. Reading this file will correct the timings which were incorrectly received by SYNCHRO from the 1-file Export for Ver 7.

- The default file name extension is .DAT for SYNCHRO version 5, .CSV for SYNCHRO 6 & 7.

- A direct linkage to and from SYNCHRO can be created which handles the export file naming, running of SYNCHRO, and optional review of SYNCHRO's results. This option is selected by entering AUTO as the EXPORT file name. When AUTO is selected, a third parameter can be entered to define what actions should be taken after the automatic export. The third parameter is ignored if AUTO is not selected. AUTO may not be abbreviated, nor may any file name used start

with the four letters A-U-T-O. When the AUTO option is selected, the export file name used is TMPSYN*.CSV or TMPSYN*.DAT.

- In order for the AUTO option of EXPORT to function properly, the PRESYNCH.CFG file must be configured to properly represent the folders where the TEAPAC, PRESYNCHRO, data and SYNCHRO files are stored (see Options-Setup menu for on-screen editing of the PRESYNCH.CFG file).

- The data files created by EXPORT use the UTDF data file format supported by SYNCHRO. This can be a single- or multi-file organization containing the various pieces of the network exported. All of the files start with the name of the file specified by <File> above, with various necessary file name suffixes appended to complete the file naming, as necessary. For example, when AUTO is used for SYNCHRO Ver 7, the implied <File> entry is 'TMPSYN' and the single file name created and opened into SYNCHRO will be TMPSYN.CSV. In Ver 6, the multiple file names created will be: TMPSYN_Layout.CSV, TMPSYN_Lanes.CSV, TMPSYN_Phasing.CSV and TMPSYN_Timing.CSV and these files should be opened into the SYNCHRO program with the Transfer-DataAccess menu in the order mentioned above using the Read button of each dialog. For Version 5, the same multiple file names with the .DAT extension are used.

FACTORS 12*<Satflow Adjustment Factor>

Defaults: 12*1.00
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter satflow adjustment factors for each movement of the current intersection to adjust 2000 *Highway Capacity Manual* satflow computations (for SIGNAL2000 file compatibility only).

<Satflow Adjustment Factor> is an adjustment factor which, when multiplied by satflows obtained from the 2000 *Highway Capacity Manual*, produce satflows that more accurately reflect conditions known to exist in the study area. It can be any number from 0.01 to 9.99. Its default value is 1.00, no adjustment.

Notes

- FACTORS are useful in adjusting 2000 *Highway Capacity Manual* computations to match surveyed satflows (i.e., calibration).

- FACTORS may also be useful in estimation of special-use lane satflows (i.e., dual-optional turn lanes - see Chapter 5).

FILES 5*<File Name>

Defaults: 5*nul
Menus/Groups: [DATAFILES]

The purpose of this command is to enter the names of the permanent storage file areas where information is to be LOADed and SAVEd.

<File Name> is the name of the file to be used, and can be any valid file name (see Appendix G). Its default value is no defined file.

Notes

- FILES can be used so that the program remembers the name of the file to be used by subsequent LOAD and SAVE commands, thus avoiding the file name entry for each LOAD and SAVE.

- The file numbers referenced by the file access commands are determined by the order of the file names in the FILES command. For example, the third file name specified on the FILES command is designated as file #3 for LOAD and SAVE.

- Each time a new file name is specified by a FILES command, the associated "next line" and "last line" values of the file are both reset to point to line 1.

- Appendix G describes details about specifying file names, etc. for your specific operating system. For example, new files that don't presently exist may use the /N suffix to the file name in order to allow the program to create a new file automatically, preventing accidental use of pre-existing files thought not to exist.

- If the /N suffix (switch) described above is not used to indicate the desire to create a New file, but the file named is not found, a message to this effect will be issued. At this point the user will be given the opportunity to say that the file should be created anyway. This action is presented in the form of a warning message, but is a valid way of creating new files without using the /N switch.

- If the /N switch is used, but the file named already exists, a message to this effect is issued and the user is given an option to use the existing file anyway, if desired.

- The default location for user data files is defined in the dialog opened by the Options-Setup menu. The Options-Setup dialog changes dynamically as the user navigates through the File-Open and File-SaveAs dialogs, and the current contents of the dialog can be saved at any time in the program's .CFG file by pressing the Save button in the Options-Setup dialog. This will cause this saved location to be the default file location the next and subsequent times the program is run, until a

new location is saved. See the detailed discussion of program installation and CFG files in Appendix G.

GENERATION	**<Direction>**	**<Generation Rate>**	**10*<Node-Dir>**
Defaults:	-	0.000	10*<0->
Menus/Groups:	[PARAMETERS]	[BASIC]	[GENERATOR]

The purpose of this command is to enter the traffic generation rates and access points and access directions for the development.

<Direction> is a keyword which describes whether the following information applies to inbound, outbound or both directions of trip generation, and can be any keyword, as described below:

IN - data applies to inbound trips only.
OUT - data applies to outbound trips only.
BOTH - data applies to inbound & outbound trips (Manual Mode only).

It has no default value; it must be entered.

<Generation Rate> is the trip generation rate to be applied to the generation base, and can be any number, which when multiplied by the BASE development size, yields the total vehicle trips generated, from -9.99 to 99.99. Its default value is 0.000.

<Node-Dir> is the node number and leg direction providing the access to the development site. For example, a 1N entry means the north leg of node 1 provides access to the site. The Node part of the entry can be 0-999 (see note below) and its default value is 0 - at least one access node is required. The Dir part of the entry is a character which describes the leg of the intersection which provides access to the site, can be either N, E, S, or W, and has no default value; it must be entered for every non-zero Node entry.

Notes

- The Node part of <Node-Dir> must be included in the list of intersections previously established with the NODELIST command.

- If a previously entered list of access nodes must be shortened, the entry of Node number 0 anywhere in the list will erase all nodes and directions from that point to the end of the list.

GOTO <Destination>

Defaults: next
Menus/Groups: [CONTROL]

The purpose of this command is to divert the input stream within a file by providing the next location to be LOADed from that file.

<Destination> is a number which defines the next line number which will be LOADed from the current file, or a variable name associated with a REPEAT loop, and can be any valid line number of the current file less than or equal to 32767 (positive, negative or zero), or any REPEAT loop variable name that is currently in use. Its default value is the line number which follows the line which contains the GOTO command.

Notes

- A REPEAT loop variable name can be used with GOTO if the same variable name is in active use by a REPEAT command. In addition, the GOTO command can only be encountered when its associated REPEAT command is the most active REPEAT command. This means that REPEAT loops must not partially overlap one another - i.e., one must be entirely contained within the other, or they must be completely separate from each other.

- A negative line number of -n will divert input to a point in the current file n lines before the line which follows the GOTO command - i.e., GOTO -5 sets up a loop which will continue to LOAD the four lines prior to the GOTO.

GRADES 4*<Grade of Approach>

Defaults: 4*0.0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the grade of each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Grade of Approach> is the grade of the approach, in percent, either positive or negative, and can be any number from -10 to 10. Its default value is 0.

Notes

- Approaches that run uphill into the intersection have a positive grade for this input. Downhill approaches have a negative grade.

GREENTIMES 6*<Phase Green Time>

Defaults: 6*0.0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION] [IMPORT]

The purpose of this command is to enter the duration of green for each of the phases of a specified phase sequence, or optionally for each of the movements, of the current intersection.

<Phase Green Time> is the duration of green for the phase or movement, given in either seconds or seconds/second, and can be any number from 0 to 900. Its default value is 0.0 seconds.

Notes

- If the list of GREENTIMES is preceded by the keyword 'Movmt', then each of the entered values will be interpreted as timings for individual through and left turn movements, clockwise around the intersection. If not, or the optional keyword 'Phase' is used, each value is for the phases defined by the SEQUENCE code.

- When entering or viewing controller timings, a Convert button appears on the GREENTIMES dialog which allows the user to select the style of entry or view, either 'By Phase' which is the traditional HCM method, or 'By Movement' which is more similar to the way timings are used on NEMA and other dual-ring controllers. If any timings are present, they will be converted to the other format at the same time, including YELLOWTIMES if the GREENTIMES dialog is displayed, and vice versa. When timings are Converted, the conversion will also include reviewing the allowed SEQUENCES list and moving the appropriate sequence code to the top of the list according to the timings present.

- It is important to make sure that YELLOWTIMES and REQCLEARANCES entries are always kept consistent with each other, especially when converting Timings by Phase to Timings by Movement and when exporting to third-party, ring-based software.

- Allowing timings 'By Movement' makes it apparent that for certain overlap phases, phase lengths which are apparently negative in the 'By Phase' method are, in fact, perfectly valid timings for dual-ring controllers, as long as the negative value of the overlap phase greentime does not exceed the yellowtime of that same phase. This permits a wider range of timings to be represented by the traditional 'By Phase' (HCM) methodology.

- 'By Movement' timings are not allowed when special phasings represented by negative SEQUENCE codes are used.

- If green times are entered in seconds/second, the first cycle length of the CYCLES command will be used to convert the phase times to seconds.

- If all entries are greater than or equal to 1.0, they are assumed to be seconds; if all entries are less than 1.0, they are assumed to be seconds/second.

- If entering GREENTIMES by phase, they must be entered in the order of the phases as specified by the SEQUENCES code and the LEADLAGS command.

- To prevent division by zero errors in SYNCHRO, all phases except overlap phases must have non-zero GREENTIMES. To analyze a phase with an effective greentime of zero, use 0.01 seconds. This will display as zero, but prevent division by zero errors.

- When EXPORTing to SYNCHRO for a split or cycle optimization, the input of GREENTIMES is not required, since they will be ignored by SYNCHRO.

- If a signal is to be double-cycled, GREENTIMES, YELLOWTIMES (and OFFSETS) must be entered in seconds (not sec/sec) which sum to 1/2 the system cycle.

GROUPTYPES 12*<Lane Group Type>

Defaults: 12*NORMAL
Menus/Groups: [PARAMETERS] [MOVEMENT]

The purpose of this command is to enter the special lane group type for each possible lane group, such as dual-optional lanes, free-flow lanes and sign-controlled lanes for the current intersection.

<Lane Group Type> is a keyword describing the type of lane group being used, and can be any of the following:

NORMAL	- normal lane group (default).
FREEFLOW	- free-flow lane group not controlled by the signal.
DUALOPTIONAL	- dual-optional lane group.
STOP	- stop sign controlled lane group
YIELD	- yield sign controlled lane group

Notes

- Free-flow movements can be defined by selecting FreeFlow for any lane groups not under signal control and not impaired in their movement through the intersection by other movements (Yield). If selected, the movement is defined as protected in every phase of RT 2X and is displayed in the phasing diagram of TIMINGS. A SATURATIONFLOW entry can be entered to control the free-flow discharge rate, or it can be left zero (as will be the case in SIGNAL2000) and 1800 vphgpl will be assumed.

- Dual-optional is a lane configuration where an exclusive turn lane exists and the adjacent lane group can be optionally used for turns as well (a shared lane group). This input condition is defined by flagging the exclusive turn lane group as a DUALOPTIONAL lane group. When this lane usage is defined, entered volumes are transferred between the lane groups in order to achieve balanced v/c, as performed in SIGNAL2000. This means that GROUPTYPE and SATFLOW entries from SIGNAL2000 are directly useable in PRESYNCHRO without modification in order to model dual-optional lane usage.

- Stop sign-controlled movements can be defined by selecting Stop for any lane groups controlled by a stop sign. When this is selected, RT 1X is adjusted to show all intersection movements in a single phase, and the sign-controlled movements are defined to use the permitted model, with RT 29 indicating the opposed movements for the type of movement under sign-control. Yield sign-controlled movements are modeled by the same method.

HEADING <Number of Lines>

Defaults: 3
Menus/Groups: [CONTROL]

The purpose of this command is to display the current title heading lines.

<Number of Lines> is the number of lines of the three-line heading which are to be displayed, and can be any number from 0 to 3, either positive or negative. Its default value is 3.

Notes

- The lines which will be displayed are identified by counting the number of lines requested starting at the last line of the heading, i.e., an entry of 1 will display only the last line of the heading -- the NOTE.

- In an appended output window, or within a script/control file, use of HEADING 0 will force a page break at that point in the output stream.

- HEADING -1 in a script/control file will force the update of the output window so that progressive results can be observed before the control file completes.

HELP <List of Commands>

Defaults: [PARAMETERS]
Menus/Groups: [INFO]

The purpose of this command is to display the command names, parameter descriptions, and default values for each command listed.

<List of Commands> is a set of commands and/or group names, and can be any valid commands or group names of the program. Its default value is [PARAMETERS] - all non-active commands for entry of parameters related to the analysis procedures.

Notes

- HELP provides a brief, 1-line summary for each of the listed commands, including the parameters and values expected and their default values.

- The Help-Commands menu produces the same result as using HELP [ALL], an alphabetical list of all commands, as found in Appendix A. The Manual Mode must be used for any of the other HELP command options.

- If HELP is requested for one command, the detailed help of the Help button or the F1 key found in any Visual Mode dialog is displayed, as found in Appendix B.

IDEALSATFLOWS 12*<Ideal Saturation Flow Rate>

Defaults: 12*1900
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the base (ideal) saturation flow rate for each movement of the current intersection (for SIGNAL2000 file compatibility only).

<Ideal Saturation Flow Rate> is the base saturation flow rate of a single lane under ideal conditions, in pcphgpl, and can be any integer value from 0 to 3000. Its default value is 1900.

Notes

IMPORT	**<File/AUTO>**	**<Display Output>**	**<Scope>**
Defaults:	AUTO	NO	TIMINGS
Menus/Groups:	[RESULTS] [IMPORT]		

The purpose of this command is to import a network from a SYNCHRO UTDF file-set, or import signal timings from a SYNCHRO UTDF file-set which was originally created by a PRESYNCHRO Export.

<File/AUTO> is the name of the SYNCHRO UTDF file-set to import from, and can be any valid file name or the keyword AUTO. Its default value is AUTO.

<Display Output> is a keyword which describes if the IMPORTed data is to be displayed during the IMPORT process and can be either NO or YES. The default value is NO.

<Scope> is a keyword which describes if the IMPORT should include just the optimized timings defined by the OPTIMIZE dialog, or an entire network defined by the UTDF file set, and can be either TIMINGS or NETWORK. The default value is TIMINGS.

Notes

- When SYNCHRO's optimization results are saved in a UTDF file-set, these results can be read by IMPORT and the CYCLE length and OFFSETs are set directly into the PRESYNCHRO program for each intersection as if manually entered. If the OPTIMIZE command is set to SPLITS+OFFSETS when the IMPORT is performed, each intersection's GREENTIMES and YELLOWTIMES are entered as well.

- If <File/AUTO> is entered as AUTO, then the automatic file name prefix (TMPSYN) used by the automatic EXPORT option is used (see EXPORT). AUTO may not be abbreviated, nor may any file name used start with the four letters A-U-T-O.

- The data files expected by IMPORT use the UTDF data file format supported by SYNCHRO. This can be a single- or multi-file organization containing the various pieces of the network exported. All of the files start with the name of the file specified by <File> above, with various necessary file name suffixes appended to complete the file naming, as necessary. For example, when AUTO is used for SYNCHRO Ver 7, the implied <File> entry is 'TMPSYN' and the single file name used will be TMPSYN.CSV. In Ver 6, the multiple file names used will be: TMPSYN_Layout.CSV, TMPSYN_Lanes.CSV, TMPSYN_Phasing.CSV and TMPSYN_Timing.CSV. For Version 5, the same multiple file names with the .DAT extension are used. These files should be written by the SYNCHRO program with the Transfer-DataAccess menu. In Ver 7, write the one CSV file with the 'Save Combined Data File' option. In Ver 6, use the Write button of each dialog. In order to avoid leaving prior data in files by these names, prior files

should be deleted first. All UTDF files must be present, even when Importing only optimized Timings.

- If the network being Imported contains diagonal legs, a MOVEMENTS.DAT file must be created which defines the movement labels used by SYNCHRO for the diagonal legs. See the discussion for error #PSY99 in Appendix E for details on how to create this file.

INITIALQUEUE 12*<Initial Queue Size>

Defaults: 12*0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the number of vehicles queued at the intersection at the start of the analysis period for each of the twelve movements of the current intersection (for SIGNAL2000 file compatibility only).

<Initial Queue Size> is the number of vehicles queued at the start of the analysis period due to unsatisfied demand in the previous analysis period, and can be any integer from 0 to 999. Its default value is 0.

Notes

- If the initial queue is observed in the field, it should be the queue observed at the end of a green phase at the start of the analysis period. This observation will reflect unsatisfied demand. The queue should not be observed at the end of a red phase, since this would be a queue which also included the significant effects of cyclical queueing, not just unsatisfied demand. The observer should also take care that the observed queue is typical of other cycles at the end of green and near the start of the analysis period, and not unduly influenced by random fluctuations in demand.

- If a non-zero initial queue value is entered, SIGNAL2000 will compute the additional d_3 delay term and adjust the d_1 term as appropriate according to the methods of the 2000 *Highway Capacity Manual*. The analyst should be aware that an analysis period with an initial queue value may generate more delay per vehicle than another analysis period which has higher volume but no initial queue. Thus, it may be appropriate to investigate any time periods which follow over-saturated periods (and thus have initial queue values) to see if the delay in these periods exceeds the over-saturated time period(s).

- If an initial queue cannot be observed where it is known (by observation or analysis) that a given time period is over-saturated, it is possible to estimate the initial queue for a given period by assessing the unsatisfied demand of a previous time period. This unsatisfied demand is displayed near the bottom of the Level of Service Worksheet, as well as the Initial Queue Delay Worksheet, and is labelled Final Queue. If this method of estimating the initial queue value is used, care should be exercised in recognition of the accumulated error which might exist each time an estimated Final Queue value is transferred to the next analysis period as an Initial Queue.

INTERSECTION <Node Number> <Description>

Defaults:	0	--
Menus/Groups:	[PARAMETERS] [BASIC] [INTERSECTION] [IMPORT]	

The purpose of this command is to enter the node number of the current intersection (and an optional description) as defined in the network.

<Node Number> is a unique intersection number assigned to the intersection, and can be any integer from 0 to 999. Its default value is 0, no intersection is specified.

<Description> is information describing the intersection, and can be up to 30 alphanumeric characters. Its default value is all blanks.

Notes

- This is one of several entries (including NODELIST, SUBSYSTEM, INTERSECTION, NODELOCATION and NETWORK) which can be made or might be altered when using the drag-and-drop network creation/editing functions in the main window. Entries made from a dialog will change the values created in the main window, and vice-versa.

- The node number entry made on the INTERSECTION command defines which intersection the following [INTERSECTION] entry commands will apply to. The INTERSECTION command must be issued prior to any other [INTERSECTION] commands. The node number used must be a number already listed in the NODELIST.

- The common convention used for describing the intersection name is to place the North-South street name first, followed by the East-West name, both separated by an ampersand, "&". Use of this convention is strongly suggested.

- If INTERSECTION 0 is specified and RESET is used, the commands which are RESET will be reset for all intersections. For example, INTERSECTION 0 followed by RESET VOLUMES will reset the VOLUMES to zero for all intersections in the NODELIST.

- In a Visual Mode dialog that includes INTERSECTION or intersection data, the "+" button, "-" button, ^Page-Up key and ^Page-Down key can be used to, in effect, dynamically issue an INTERSECTION command for the next and previous intersection in the NODELIST. If data values are changed on a screen display, the ^Page keys should not be used before the data is first entered with the TAB key.

IODEVICES	**<Visual View>**	**<Page #>**	**<Lines/Pg>**	**<Last Line #>**
Defaults:	NORMAL	0	66	63
Menus/Groups:	[CONTROL]			

The purpose of this command is to set the visual view style for dialogs, as well as the page number and the size of the output medium (i.e., paper).

<Visual View> is a keyword representing view of the Visual Mode which will be used, and can be either keyword described below.

NORMAL	the normal view of the Visual Mode (default).
TABULAR	the tabular view of the Visual Mode.

<Page #> is the number of the next page to be printed, and can be zero, -1, or any positive integer up to 32767. Its default value is 0 - do not display page number on output.

<Lines/Pg> is the number of printable lines on each page of output, and can be zero, or any positive integer up to 32767. Its default value is 66, the typical size of printed output on 8-1/2 x 11 paper at 6 lines per inch.

<Last Line #> is the number of lines, counting from the top of the page, which are to be used for printing, and can be zero, or any positive integer less-than or equal to <Lines/Pg>. Its default value is 63, which normally allows a half-inch margin at the bottom of a 66-line page.

Notes

- Printers normally print 6 lines per inch, thus an 11-inch page is 66 lines and an 8 1/2-inch page is 51 lines. Normally <Last Line #> is 3 less than <Lines/Pg> to allow a 1/2-inch margin.

- Every time a <Line/Pg> entry is made, <Last Line #> is re-calculated as 3 lines less than <Lines/Pg>. This usually provides a 1/2" margin at the bottom of each page of output. As a result, unless a different bottom margin is desired, <Last Line #> need not be entered.

- Use of <Lines/Pg> and <Last Line #> are primarily for the purposes of batch operations or any commands which generate multiple pages of output.

- If the <Page #> entry is greater than zero, this number will used to label the page number of the next printed page of output. Every time this occurs, the <Page #> is incremented so that the next printed page will be automatically numbered with the page number. If <Page #> is zero, no page number will be displayed on the printed output. If <Page #> is -1, the date and time will also be omitted from the the output.

LANES 12*<Number of Lanes>

Defaults: 12*0
Menus/Groups: [PARAMETERS] [BASIC] [MOVEMENT]

The purpose of this command is to enter the number of lanes which are assigned for use by each of the twelve movements at the current intersection.

<Number of Lanes> is the number of lanes which are allocated for use by each movement, and can be any integer from 0 to 10. Its default value is 0.

Notes

- Values for this command are automatically generated each time a new lane width is given on a WIDTHS command. The number of lanes generated is defined by the tens digit of the approach width (in feet). Approach widths of less than ten feet and greater than zero are assumed to have one lane. Thus, usage of the LANES command is necessary only for those lanes where this assumption of number of lanes is not appropriate.

- Turning movements which turn from both exclusive turn lanes and shared through lanes should make use of the GROUPTYPES entry to define this condition which PRESYNCHRO calls dual optional lane usage

LEADLAGS 2*<Lead-Lag Phasing>

Defaults: 2*NONE
Menus/Groups: [PARAMETERS] [INTERSECTION] [IMPORT]

The purpose of this command is to enter the order of the phases, particularly in multiphase operation, of the current intersection.

<Lead-Lag Phasing> is the keyword which, in multi-phase operation, specifies whether the exclusive phase(s) (usually turning phase) precede(s) or follow(s) the through phase, and can be any of the following:

NONE	no exclusive turn phase(s) exist, or if they do, they LEAD (default).
LEAD	exclusive turn phase(s) precede(s) the through phase.
LAG	exclusive turn phase(s) follow(s) the through phase.

Notes

- The first <Lead-Lag Phasing> is used for the north-south movements, the second for east-west movements.

- In split phase operation NONE or LEAD indicates the north (east) movement precedes the south (west) movement. LAG indicates the south (west) precedes the north (east).

LEVELOFSERVICE	**<Target Delay/LOS> <Target v/c>**	**<Max Delay/LOS> <Max v/c>**	**<Delay Incr> <v/c Incr>**
Defaults:	35:C	80:E	5
	90	100	5
Menus/Groups:	[PARAMETERS] [SIGNAL2000]		

The purpose of this command is to enter the range of delay (or level of service) and v/c which should be tested by a DESIGN optimization and GOVERCS for the current intersection (for SIGNAL2000 file compatibility only).

<Target Delay/LOS> is the desired or target delay (or level of service) of operation of the critical movements, and can be any integer delay from 0 to 300 seconds, or a level of service grade A, B, C, D, or E. Its default value is 35 seconds of delay (LOS C).

<Max Delay/LOS> is the worst amount of delay (or level of service) to be considered before a v/c optimization is attempted, and can be any integer delay from 0 to 300 seconds, or a level of service grade A, B, C, D, or E. Its default value is 80 seconds of delay (LOS E).

<Delay Incr> is the increment of delay which should be used to reach the <Max Delay/LOS> if the <Target Delay/LOS> cannot be achieved by a DESIGN, and can be any integer delay from 1 to 100 seconds. Its default value is 5 seconds.

<Target v/c> is the desired or target v/c of operation of the critical movements, and can be any integer v/c from 0 to 300 percent. Its default value is 90 percent (v/c = 0.90).

<Max v/c> is the worst amount of v/c to be considered before an optimization is abandoned and a solution is forced, and can be any integer v/c from 0 to 300 percent. Its default value is 100 percent (v/c = 1.00).

<v/c Incr> is the increment of v/c which should be used to reach the <Max v/c> if the <Target v/c> cannot be achieved by a DESIGN. Its default value is 5 percent.

Notes

- For DESIGN, the <Target Delay/LOS> entry of the LEVELOFSERVICE command sets the target delay (or level of service) which is to be achieved for all critical movements of the intersection. If this target level is achieved with excess time still available at the intersection, then the excess time is assigned to the phases according to the entries on the EXCESS command. If no EXCESS entries have been made, time is allocated proportionally to all phases. However, if EXCESS is used, this provides a means to designate a worst-case delay/LOS performance level for all critical movements and to assign all additional time to the priority movements of the EXCESS command. This is the preferred optimization scheme for the DESIGN function of SIGNAL2000 (see Appendix C for more details).

- The <Max Delay/LOS> must be a worse level or the same level as the <Target Delay/LOS>.

- If <Target Delay/LOS> is set to zero, any attempt to balance delays among the critical movements is skipped and the optimization starts with an attempt to meet the <Target v/c> value for all critical movements.

LINKLIST 200*< <Node Number> <Direction> >

Defaults: <all possible links>
Menus/Groups: [PARAMETERS] [SYSTEM]

The purpose of this command is to enter the simulation order for each link in the network, primarily for earlier versions of TRANSYT. This command appears only for compatibility with PRETRANSYT, and is not presently used in PRESYNCHRO.

<Node Number> is the number assigned to each intersection as identified on the NODELIST command, and can be any integer from 0 to 327. Its default value is 0, it must be specified.

<Direction> is the direction from which the traffic is approaching the node, and can be the keyword NORTH, EAST, SOUTH or WEST. It has no default value, and must be entered.

Notes

- The use of the LINKLIST is not required except a) when a version of TRANSYT earlier than version 7 is used, in which case a LINKLIST is required by TRANSYT, or b) if a special list of links to be included in a simulation/optimization is desired. In normal applications of current version of TRANSYT, the LINKLIST is not needed or used. The links to be simulated/optimized in this case is every possible link PRESYNCHRO generates.

- In earlier versions of TRANSYT (prior to version 7), before a link can be simulated, all links that directly feed into it must either be simulated, assumed to be uniform random arrivals, or identified as a dummy link. When dummy links are required, they are indicated by using negative node numbers in the LINKLIST.

- If only offsets will be optimized with TRANSYT, the LINKLIST command may be used to define only internal links between intersections. In this case, PRESYNCHRO will create any necessary external links which feed the internal links, thus minimizing the total number of links simulated, and thus reducing the optimization time.

LOAD	**<Line Number>**	**<File Number>**	**<LOAD Type>**	**<# Blocks>**
Defaults:	next	next	PROCESS	-
Menus/Groups:	[DATAFILES]			

The purpose of this command is to input commands and parameters from permanent storage locations specified by the FILES command.

<Line Number> is the first line number in the specified file from which commands will be obtained, and can be any valid line number of the file less than or equal to 32767 (positive, negative or zero). Its default value is the "next line" of the file.

<File Number> is the order number of the desired file on the FILES command, and can be any integer from 1 to 5. Its default value is the "next file" in the file list.

<LOAD Type> is a keyword describing whether all commands from the file should be processed, or if some or all commands should be ignored, and can be any keyword described below.

PROCESS	process all commands (default).
SHARE	ignore unrecognized commands, e.g., share a data file from another program.
IGNORE	ignore all commands in the file up to the next RETURN, e.g., skip a data block.

<# Blocks> is the number of data blocks in the file which should be SHAREd or IGNOREd, and can be any positive integer from 1 to 999. Its default value is 1.

Notes

- Upon initiation of a LOAD command, commands will be obtained from the specified file starting at the specified line number and continuing with successive line numbers until a RETURN command is encountered. SAVE automatically places a RETURN command at the end of SAVEd information for future LOADs.

- The "next line" default is defined as the line number following the line of the file which was last accessed. This is usually the line number which follows the last information LOADed. When a FILES command is given, the "next line" for the specified file is automatically set equal to one. The "next line" can be changed by use of the NEXTLINES command.

- The "next file" default is defined as the file whose number is one greater than the file number currently in use. The keyboard should be considered file 0 for this purpose. Thus, the default file number for a LOAD from the keyboard is file #1. If a LOAD command is encountered in file #1, its "next file" default is file #2, etc.

- If <Line Number> is entered as 0, the LOAD will start at the "last line". The "last line" is defined as the last point in the file where file access was previously initiated. For example, LOAD 10 followed later by LOAD 0 will re-execute the LOAD 10, effectively a re-LOAD. LOAD 10 followed later by SAVE 0 will re-SAVE the LOADed parameters (see Chapter 5 of the *TEAPAC Tutorial/Reference Manual*).

- A negative <Line Number> of -n will start the LOAD at a point in the designated file n lines before the default "next line" of the file - i.e., LOAD -5 will start the LOAD five lines prior to the current "next line" of the file.

- The SHARE/IGNORE option is only in effect during the LOAD where the option was used (do not use embedded LOADs with the SHARE option). Use of the SHARE option not only ignores commands which it does not recognize, but also ignores any RESET commands encountered during the current LOAD. It is used to share files created by other programs. IGNORE ignores all commands in the file up to the next RETURN command.

- SHARE is automatic when the program detects a data file from a different TEAPAC program, or is unable to determine the source of the data file.

- The <# Blocks> indicates how many successive LOADs should be done, using the current SHARE or IGNORE option, as a result of the single LOAD command that was issued. This option does not apply to the PROCESS keyword.

MASTERNODE <Master Node #>

Defaults: 0
Menus/Groups: [PARAMETERS] [SYSTEM] [EXPORT]

The purpose of this command is to enter the node number of the intersection which is the master node location for the system. This command appears only for compatibility with PRETRANSYT, and is not presently used in PRESYNCHRO.

<Master Node #> is the node number of the intersection which acts as the master location for the system, and can be any valid node number from 0 to 999. Its default value is 0, no master node defined.

Notes

- The system cycle length for coordinated systems will be equal to <Minimum Cycle> for the intersection referenced by MASTERNODE. If MASTERNODE is 0, <Minimum Cycle> for the first node in the NODELIST will be used as the system cycle.

- The node number entered need not be the actual location of the master controller. This entry simply indicates that the offset which is entered for the master intersection will not be changed by TRANSYT or PASSER during the optimization process.

- If the node number given is not included in the current NODELIST/SUBSYSTEM, the master node input for TRANSYT or PASSER will be omitted to prevent an error in the TRANSYT and PASSER runs.

MESSAGES <Level of Messages>

Defaults: 3
Menus/Groups: [INFO]

The purpose of this command is to display messages concerning changes made to the program since the last printing of the tutorial/reference manual.

<Level of Messages> is the level of detail desired for the update messages, and can be any integer from 0 to 3, as described below.

0 display only the current version/level of the program.
1 display a summary of changes made in the last revision of the program.
2 display detailed discussions of each change made in the last revision of the program.
3 display detailed discussions of all recent revisions to the program (default).

Notes

- The Help-RecentChanges menu uses message level 3 by default. The Manual Mode must be used for any of the other options.

- Messages concerning changes, bugs, fixes, etc., in the program will be displayed. For option 3, the version/level number and date of each revision of the program will be displayed at the start of each message listing. For this option, different version/levels of the program are listed in reverse chronological order, with the most current version first.

- All messages for versions of the program after the version shown on the title page of the tutorial/reference manual should be printed and inserted in Appendix H of the manual as addenda to the manual. These changes will not be referenced anywhere in that release of the manual.

METROAREA <Location>

Defaults: NON-CBD
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the location of the intersection within the metropolitan area of the current intersection (for SIGNAL2000 file compatibility only).

<Location> is a keyword describing the location of the intersection within the metropolitan area, and can be any of the following:

CBD	central business district.
NON-CBD	any area other than CBD (default).

Notes

- Entry of any keyword other than CBD will generate a NON-CBD entry, since this is the only area location distinction made by the 2000 *Highway Capacity Manual* computations. The other keywords are allowed for compatibility with previous versions of SIGNAL2000 (SIGNAL97, SIGNAL94, SIGNAL85 and SIGNAL). Only the CBD and NON-CBD keywords are SAVEd in a data file.

MINIMUMS 12*<Minimum Green Time>

Defaults: 12*5.0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION]

The purpose of this command is to enter the minimum green time requirements for each of the twelve movements at the current intersection.

<Minimum Green Time> is the number of seconds which, as a minimum, must be received by the movement in order to satisfy requirements of safety and driver reaction, and can be any number from 0 to 99.9. Its default value is 5.0 seconds.

Notes

- Use of MINIMUMS is only important if SYNCHRO will be allowed to optimize the split times at each intersection. This includes a CYCLE+SPLIT+OFFSET optimization. In this case, MINIMUMS must be entered very carefully to control the limits to which SYNCHRO will be allowed to go when optimizing the splits. See notes below.

- When allowing SYNCHRO to optimize splits, MINIMUMS is useful in establishing minimum pedestrian crossing times, as well as operational minimums. To consider a minimum pedestrian constraint, usually setting the minimum green time for the through movement adjacent to the pedestrian crossing will properly constrain the optimum timings. For example, pedestrians crossing the east leg would typically use the same green time as the through movement on the south approach, so the minimum of the south through movement should be set to consider these pedestrians.

- Yellow and all-red clearance times should not be included in the minimum green time entries.

MOVLABELS 12*<Movement Label>

Defaults: 4*(RT TH LT)
Menus/Groups: [PARAMETERS] [INTERSECTION] [SIGNAL2000]

The purpose of this command is to enter abbreviated labels for each movement of the current intersection.

<Movement Label> is a two-character abbreviation used to identify each of the twelve movements at the intersection, and can be any pair of printable characters. Its default value is RT, TH, LT, for the right turns, throughs, and left turns of each approach, respectively.

Notes

- Use of MOVLABELS does not change the order of entry -- this order is always clockwise starting with the north approach. MOVLABELS merely allows each movement to be labeled with the user's choice of characters.

NETWORK	**<Direction> <Distance> <Speed> <Node #> 4*<Movement #> <Assignment Method> <Curvature> <Manual Distance>**				
Defaults:	--	0	0	0	4*0
	Default		None		
Menus/Groups:	[PARAMETERS]	[BASIC]	[INTERSECTION]		

The purpose of this command is to enter the current intersection's relative location in the system network, including spatial and speed parameters.

<Direction> is the approach to the intersection for which the following data applies, and can be NORTH, EAST, SOUTH, or WEST. There is no default value for this parameter, it must be entered.

<Distance> is the distance, in feet, from the closest upstream node for the approach specified, and can be any number from 0 to 32000. Its default value is 0.

<Speed> is the travel speed, in miles per hour, approaching the node for the approach specified, and can be any number from 0 to 65. Its default value is 0.

<Node #> is the upstream node number for the approach specified, and can be any node number defined in the system and usually, but not necessarily, in the specified node list, from 0 to 999. Its default value is 0.

<Movement #> is the movement number at the specified upstream node which provides traffic flow to the current intersection, and can be 0 or 1-12. Its default value is 0 (see discussion below).

<Assignment Method> is the method to be used to assign upstream volumes to downstream links, and can be DEFAULT, FULL or LIMITED. Its default value is DEFAULT.

<Curvature> is curvature of the link from the perspective of the driver approaching the intersection, and can be NONE, RIGHT or LEFT. Its default value is NONE.

<Manual Distance> is a flag which identifies if the upstream distance above has been entered manually and is intentionally inconsistent with the network scale, and can be NO or YES. Its default value is NO.

Notes

- This is one of several entries (including NODELIST, SUBSYSTEM, INTERSECTION, NODELOCATION and NETWORK) which can be made or might be altered when using the drag-and-drop network creation/editing functions in the main window. Entries made from a dialog will change the values created in the main window, and vice-versa.

- If no <Movement #> is entered, <Movement #>s are calculated when needed assuming a rectangular network relationship. That is, if no <Movement #> is entered for the north approach, the movement numbers of the upstream node which are assumed to feed the downstream node are 2, 6 and 10.

- <Assignment Method> and <Curvature> are not not used by PRESYNCHRO.

- If <Manual Distance> is set to YES, the upstream distance for this link will be excluded from the calculation of the avergage network scale factor, as well as any checks for consistency between the link's apparent scale factor (based on its endpoint coordinates) and the rest of the network. A value of NO is recommended, but if an upstream distance is intentionally inconsistent with the coordinate values and real network scale factor, YES should be used to prevent that condition from improperly affecting the calculation of the average network scale factor and related contingency checks for network connections which are made.

NEWPAGE <Page Advance Option>

Defaults: YES
Menus/Groups: [CONTROL]

The purpose of this command is to enter a flag indicating that the next output report should begin with title headings at the top of the next page.

<Page Advance Option> is a keyword identifying whether or not the next report should be forced onto the next page of output even if it will fit on the remaining portion of the current page, and can be either of the keywords described below.

NO	do not force a new page with the next report.
YES	advance to a new page with the next report output (default).

Notes

- If the page length is set to zero with IODEVICES, titles will be printed at the current page location without a page advance (continuous printing). Use of NEWPAGE is primarily oriented towards the batch mode, using control files.

- In the batch mode, if a report is too large to fit on the remaining portion of the designated report length on the current page (as designated on the IODEVICES command), it will be placed on a new page regardless of the condition specified by the NEWPAGE command.

- If the first command to reset on the RESET command is [PARAMETERS], a NEWPAGE YES command is automatically invoked. Thus, any report produced following a RESET command will be forced to the top of the next page. This feature can be defeated by use of a NEWPAGE NO following the RESET command.

NEXTLINES 5*<Next Line of File>

Defaults: 5*next
Menus/Groups: [DATAFILES]

The purpose of this command is to enter the default next line to be accessed in each of the five files.

<Next Line of File> is the line number of the default next line to be accessed in the file, and can be zero or any positive number less than or equal to the last line of the file and less than or equal to 32767. Its default value is the line number after the last line accessed for each file.

Notes

- The "next line" of a file is automatically set each time a RETURN command is encountered in a file. In this case, the "next line" of that file is set to the line number of the line which follows the RETURN command.

- The "next line" of a file is automatically set to 1 each time a file is opened with the FILES command.

- This command is particularly useful to initialize repeated execution of sets of commands which use the default value of <Line Number> for the LOAD command.

NODELIST 500*<Node Number>

Defaults: -
Menus/Groups: [PARAMETERS] [BASIC] [SYSTEM]

The purpose of this command is to enter the list of nodes to be simulated or optimized.

<Node Number> is a unique number assigned to each intersection on the INTERSECTION command, and can be any integer from 0 to 999. Its default value is 0, and thus must be entered.

Notes

- This is one of several entries (including NODELIST, SUBSYSTEM, INTERSECTION, NODELOCATION and NETWORK) which can be made or might be altered when using the drag-and-drop network creation/editing functions in the main window. Entries made from a dialog will change the values created in the main window, and vice-versa.

- For compatibility with PRETRANSYT, node numbers cannot exceed the value of 327, since all node numbers will be multiplied by 100 when link numbers are created, and PRETRANSYT cannot create link numbers greater than 32767 due to internal arithmetic limitations. When using Release 6 or higher of TRANSYT7F and modeling permitted left turns, either with exclusive-permissive phases or permitted-only phases, TRANSYT requires that the permitted movement link number be input as a negative number. Since only five columns are allowed for the input, the negative sign leaves four columns for the link number, thus node numbers less than 100 are recommended. 99 is the limit for TRANSYT Release 9.

- In Usage Level 1 versions of PRESYNCHRO, the NODELIST can only be 12 nodes in length. In Usage Level 2 versions, the NODELIST can be as many as 100 nodes in length. Usage Level 3 allows up to 500 nodes.

- When in the Visual Mode or using the ASK command to enter the NODELIST, the actual list can be enetered only once. After this entry, the list must be modified one intersection at a time with the edit buttons of the NODELIST dialog. When entering the NODELIST this first time, type no more than 80 characters per entry, using ampersands (&) to continue long entries to subsequent entry lines.

NODELOCATION <X-Y Coordinates>

Defaults: 0, 0
Menus/Groups: [PARAMETERS] [INTERSECTION]

The purpose of this command is to enter the X and Y coordinates of the current intersection.

<X-Y Coordinates> is the X and Y coordinates of the intersection, and can be any common coordinate system value, as an integer from -2,147,483,647 to 2,147,483,647. Its default value is 0, 0.

Notes

- This is one of several entries (including NODELIST, SUBSYSTEM, INTERSECTION, NODELOCATION and NETWORK) which can be made or might be altered when using the drag-and-drop network creation/editing functions in the main window. Entries made from a dialog will change the values created in the main window, and vice-versa.

NOTE <Third Title Line>

Defaults: 80 blanks
Menus/Groups: [TITLES]

The purpose of this command is to enter the third line of information contained in the title of each report.

<Third Title Line> is the third of three lines of information, generally used to note further conditions identifying the situation being analyzed, displayed at the top of every output report., and can be up to 80 characters of information. Its default value is 80 blanks.

Notes

- If the first character of the NOTE parameter is a plus sign, "+", the characters entered on this command will be overlaid over those of the previously entered NOTE command. This overlay will begin at the character position identified by the digits of the first two characters which follow the "+", and will end after the last non-blank character which is entered. See Chapter 5 of the *TEAPAC Tutorial/Reference Manual* for further explanation and examples of this feature.

- Entries on this command may be enclosed in 'single quotes' or "double quotes". This option provides the capability to include leading blanks in the entry, which is otherwise not possible. This option can also be used to enter a single blank as the title line using a ' ' or " " entry, thereby blanking out the entire prior contents of the title line.

- The name of the current open file can be inserted anywhere in the title line by placing %F at the desired location of the title line. The file name can be placed at a specific column location in a title line by using the +XX form of a title entry noted above.

NSTOPFACTORS 12*<Stops Adjustment Factor>

Defaults: 12*1.00
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter twelve factors for the current intersection used to adjust the number of stops calculations of the EVALUATE report, for example, to match the number of stops obtained from a network simulation model (for SIGNAL2000 file compatibility only).

<Stops Adjustment Factor> is the factor to adjust number of stops calculated for each movement, and can be any number from 0.01 to 9.99. Its default value is 1.00, no adjustment.

Notes

- If number of stops have been simulated with a network model such as TRANSYT-7F or NETSIM/CORSIM which does a better job of modeling delay between coordinated signals than the 2000 *Highway Capacity Manual* allows, NSTOPFACTORS may be used to force the calculations of number of stops in EVALUATE to the same values. For example, if EVALUATE calculates 20 stops, but TRANSYT-7F estimates 16 stops, use an NSTOPFACTOR of 0.80.

OFFSET <Offset> <Phase Number>

Defaults: 0.00 0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION] [IMPORT]

The purpose of this command is to enter the coordinated offset for a phase of the phase sequence at the current intersection.

<Offset> is the coordinated offset in seconds or seconds/second, and can be any number from 0 to 900. Its default value is 0.00.

<Phase Number> is the phase for which the offset is specified, and can be 0-6. Its default value is 1.

Notes

- An offset greater than or equal to 1.0 is assumed to be in seconds; less than 1.0 is assumed to be in seconds/second.

- If a signal is to be double-cycled the OFFSET must be entered in seconds (not sec/sec).

OPTIMIZE	**<Optimization Type>**	**<Step Size List>**
Defaults:	NONE	15*0
Menus/Groups:	[PARAMETERS] [BASIC]	[SYSTEM] [EXPORT]

The purpose of this command is to enter the type of optimization to be performed. This command appears only for compatibility with PREPASSR and PRETRANSYT, and is not presently used in PRESYNCHRO.

<Optimization Type> defines the values that are to be optimized by SYNCHRO, and can be any of the following keywords:

NONE	No optimization, only a simulation of input (default).
OFFSETS	Optimize offsets only.
SPLITS+OFFSETS	Optimizes splits and offsets.
CYCLE+SPL+OFF	Optimizes cycle, split and offset.
LIST	Allows user to specify the step sizes used in the hillclimb optimizing process.

<Step Size List> defines up to 15 step sizes to be used by TRANSYT when the LIST option is selected above, or defines the DI, PI, PROS/DI, optimization type and multi-cycle options of card type 5x when LIST is not selected. It can be any valid step sizes or option values for the TRANSYT model, from -3 to 99. Its default value is 0 0 0 2 0 which assumes the LIST option is not selected.

Notes

- If CYCLE optimization is selected for TRANSYT or PASSER, the CYCLES command must also specify a cycle range with more than one cycle.

- If the LIST option of OPTIMIZE is not used, then the first three step size values input are used to designate the 2nd, 3rd and 4th fields of the 5X card. These are, respectively, the definition of the disutility index (DI), the definition of the performance index (PI), and the relative weight of PROS for the PROS/DI performance index. The default values of 0 for these fields perform the normal minimization of delay and stops, but these entries can be used to conduct other optimizations, with the PROS model being the one of greatest interest.

- If the LIST option of OPTIMIZE is not used, then the fourth step size value input is used to designate the 8th field of the 5X card, the optimization algorithm -- 2 for Hillclimb, 1 for Genetic non-elitist, and 0 for Genetic elitist.

- If the LIST option of OPTIMIZE is not used, then the fifth step size value input is used to designate whether a single-cycle (0) or multi-cycle (1) simulation will be performed, as defined by the X-value of the 5X card. If multi-cycle is selected, step-wise simulation will be forced.

- If LIST is used, then when a zero value is entered as a step size anywhere except the first field, this will zero out the remainder of the step size list.

OUTPUT <Prog>

Defaults: PRESYNCHRO
Menus/Groups: [PARAMETERS] [SYSTEM] [EXPORT]

The purpose of this command is to enter the version of SYNCHRO to create input for. OUTPUT is not presently used by PRESYNCHRO.

<Prog> is the TEAPAC program for which the OUTPUT values are to be provided, and can be any valid TEAPAC program name. Its default value is PRESYNCHRO.

Notes

OVERLAPS 4*<Right Turn Overlap>

Defaults: 4*YES
Menus/Groups: [PARAMETERS] [INTERSECTION]

The purpose of this command is to enter how right turn overlaps are to be handled for each approach of the current intersection.

<Right Turn Overlap> is a keyword which describes whether right turns will be added to the standard phasings in overlap phases where exclusive right turn lanes exist, as follows:

NO	don't allow right turn overlap under any condition.
YES	allow right turn overlap into adjacent phases if an exclusive right turn lane exists (default).

Notes

- The default is YES for each right turn, meaning that if an exclusive right turn lane exists and the phasing would allow a non-conflicting overlap to be added as an extension of the normal right turn indication, it will be added. The other option, NO, will prevent the addition of a right turn in an overlap phase, regardless of the turn lane or phasing conditions.

PARKINGSIDES 4*<Parking Location>

Defaults: 4*NONE
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter parking conditions on each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Parking Location> is a keyword which describes, from the driver's point of view, the parking conditions on the approach, and can be any of the following:

NONE	- no parking (default).
LEFT	- parking on the left side.
RIGHT	- parking on the right side.
BOTH	- parking on both sides.

Notes

- PARKVOLUMES must be used in conjunction with PARKINGSIDES to define the number of parking maneuvers each hour. The default PARKVOLUMES is 20, but if PARKINGSIDES is NONE, PARKVOLUMES is ignored.

- Parking conditions only apply to the lane group to which they are adjacent.

PARKVOLUMES 4*<Parking Volume>

Defaults: 4*20
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the number of parking maneuvers per hour on each side of each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Parking Volume> is the number of parking maneuvers per hour, and can be any integer from 0 to 180. Its default value is 20.

Notes

- PARKVOLUMES must be used in conjunction with PARKINGSIDES to define the number of parking maneuvers each hour. The number entered is for one side of the approach only. If parking exists on both sides of a 1-way approach, the average number of maneuvers on each side should be entered. If one lane group is adjacent to both sides of parking, the number entered will be doubled to calculate the parking adjustment factor.

- The default PARKVOLUMES is 20, but if PARKINGSIDES is NONE, PARKVOLUMES is ignored.

PATHASSIGNMENT	**<Path #>**	**<Path %>**	**<Path List>**
Defaults:	0	0	8*0
Menus/Groups:	[PARAMETERS]	[SITE]	

The purpose of this command is to enter a path (list of intersections) which vehicles of the current distribution type follow when traveling to and from the development.

<Path #> is the path number which determines which of the four possible paths is to be defined for the current distribution type, and can be 1-5 - a selected path number. It has no default value; it must be entered.

<Path %> is the percentage of total trips generated for the current distribution type which is to be assigned to the following path, and can be 0 - 100 percent. Its default value is 0.

<Path List> is a list of intersection node numbers, separated by spaces, through which vehicles generated by the site for the current distribution type, in the order they occur in the path, and not to exceed 16 intersections in length. Each entry can be any valid intersection number (see note below). Its default value is 0; it must be entered.

Notes

- The first and last node numbers of the <Path List> must agree with the external node number of the current PATHDISTRIBUTION type and one of the access points of the GENERATION command. If the distribution type is an inbound type, the first node number must be the external node of the current distribution type and the last node number must be an inbound access node. If the distribution type is outbound, the reverse applies.

- Previously entered path lists on the PATHASSIGNMENT command can be deleted by entering a zero percentage for the list. This completely removes the list of intersections, which is readily apparent in the Visual Mode, and also ignores any list which may be entered following the zero percentage. This allows the removal of an unneeded list of intersections.

- If a previously entered PATHASSIGNMENT list must be shortened, the entry of node number 0 anywhere in the list will erase all nodes from that point to the end of the list. If the entire path is to be discarded, either replace it with a new path or use 0 percent so that the path is effectively ignored -- at this point an entire path cannot be eliminated from the PATHASSIGNMENT command.

- Intersection node numbers in <Path List> must match intersections previously established with the NODELIST command.

PATHDISTRIBUTION	**<Distr Type #>** **<Descr>**	**<Distr %>**	**<Node #>**	**<Node Dir>**
Defaults:	- 30-blanks	0	0	-
Menus/Groups:	[PARAMETERS] [SITE]			

The purpose of this command is to enter and set the current distribution type number, and enter its related distribution percentage, external node, and description.

<Distr Type #> is the number of the distribution type for which the following distribution information applies, and which will become the current distribution type #. It can be any integer from 0-150 (see note below). Its default value is 0; it must be entered.

<Distr %> is the percentage of total trips generated by the site which are distributed to this distribution type, and can be -100 to 100 percent. Its default value is 0; it must be entered.

<Node #> is the external node number through which all traffic for this distribution type enters or exits the study network, and can be 0-999 (see note below). Its default value is 0; it must be entered.

<Node Dir> is the approach of the external intersection which connects the study network to the external road network, and can be the keyword NORTH, EAST, SOUTH or WEST. It has no default value; it must be entered.

<Descr> is a set of words which describe what type of traffic is defined by this distribution type, usually including whether it is inbound or outbound traffic and which point of the compass or primary travel route the external point of the trips are destined, and can be any 30 alphabetic or numeric characters. Its default value is 30 blanks.

Notes

- The PATHDISTRIBUTION command must first be used to define the "current" distribution type before the PATHASSIGNMENT command can be used to describe travel paths for the "current" distribution type.

- All PATHDISTRIBUTIONs must be defined before the FINDPATHS command can be used to assist in the definition of PATHASSIGNMENTS.

- <Distribution Type #> must not exceed the limit previously established by the SITESIZE command, and <Node #> must be an intersection included in the current NODELIST command.

- In a Visual Mode dialog that includes PATHDISTRIBUTION or distribution type data, the "+" button, "-" button, ^Page-Up key and ^Page-Down key can be used to, in effect, dynamically issue a PATHDISTRIBUTION command for the next

and previous type numbers. If data values are changed on a screen display, the ^Page keys should not be used before the data is first entered with the TAB key.

PEAKHOURFACTORS 12*<Peak Hour Factor>

Defaults: 12*0.90
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION]

The purpose of this command is to enter the peak hour factor for each movement of the current intersection.

<Peak Hour Factor> is the peak hour factor for each movement, and can be any number from 0.50 - 1.00. Its default value is 0.90.

Notes

- Peak hour factors are applied to the demand volume to determine the "adjusted volume" for future use in the V/C and delay calculations. As such, caution should be used in applying peak hour factors much less than 0.90 since "adjusted volumes" substantially higher than the hourly volumes will be generated.

- Caution should be exercised in calculating peak hour factors from traffic counts, particularly on a movement-by-movement basis, since this calculation may not be statistically stable, especially for low volume movements.

PEDLEVELS 4*<Pedestrian Interference>

Defaults: 4*0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the level of pedestrian interference for right turns on each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Pedestrian Interference> is the volume of conflicting pedestrians, in peds per hour, for right turns on the approach, and can be any integer from 0 to 5000. Its default value is 0.

Notes

- Entries for pedestrian interference should be made for the approach from which the conflicting right turn is made. For example, pedestrians crossing the east leg of the intersection interfere with right turns made from the south approach, so the <Pedestrian Interference> value for that right turn should be input for the south approach.

- Under certain phasing conditions, pedestrian interference can also affect the left turns coming from the opposite approach than the right turns described in note 1. above. For example, pedestrians crossing the east leg of the intersection may also interfere with left turns made from the north approach. The <Pedestrian Interference> value for this left turn should be input for the opposite (south) approach as in the case of the right turns in note 1. above.

- Versions of the SIGNAL/TEAPAC program prior to SIGNAL2000 (SIGNAL97, SIGNAL94, etc.) permitted the use of certain keywords to represent typical ped volume conditions. To permit upwards-compatibility of data files from these earlier programs, SIGNAL2000 will convert these keywords in the same manner as the earlier programs using the following relationships between the number of conflicting pedestrians and the keyword used: LOW=50, MODERATE=200 and HIGH=400. These numeric values will be the values saved if this data is subsequently saved by SIGNAL2000.

- If an exclusive pedestrian phase is defined with the PEDTIME entry, PEDLEVELS should be set to zero since there should be no pedestrian interference with vehicular traffic during vehicle phases.

PEDTIME	**<Exclusive Pedestrian Phase Time>**	**<Phase Number>**
Defaults:	0.0	0
Menus/Groups:	[PARAMETER] [SIGNAL2000]	

The purpose of this command is to enter the time for an exclusive pedestrian scramble phase for the current intersection (for SIGNAL2000 file compatibility only).

<Exclusive Pedestrian Phase Time> is the length of time in seconds to be allocated to an exclusive pedestrian phase (all red for vehicles), and can be any number from 0 to 900 and less than the cycle length for the phasing. Its default value is 0.0.

<Phase Number> is the number of the phase which the exclusive pedestrian phase follows, and can be any number from 0 to 6 and less than or equal to the number of phases in the sequence of operation. Its default value is 0 for no exclusive ped phase, or position in phasing is not important (placed at end of phasing).

Notes

- If an exclusive pedestrian phase is defined with the PEDTIME entry, PEDLEVELS should be set to zero since there should be no pedestrian interference with vehicular traffic during vehicle phases.

- PEDTIME can also be used to hold aside time for any sort of interruption in the cycle, not just a ped phase. For example, legs of the intersection not included in the four legs of the analysis or certain types of pre-emption.

PERIODS	**<Count Interval>**	**5*< <Start Time> <Stop Time> >**
Defaults:	15	5*<- ->
Menus/Groups:	[PARAMETERS]	[TURNS/WARRANTS]

The purpose of this command is to enter the count interval and the beginning and ending times for each count period for which subsequent data will be entered at the current intersection.

<Count Interval> is the interval, in minutes, between each count entry, and can be either 15 or 60 minutes. Its default value is 15 minutes.

<Start Time> is the time for each count period when the count was started, on a 24-hour clock, and can be any valid time between 0 - 2400 hours. It has no default value, and at least one <Start Time> must be entered.

<Stop Time> is the time for each count period when the count was stopped, on a 24-hour clock, and can be any valid time between 0 - 2400 hours. It has no default value , and at least one <Stop Time> must be entered.

Notes

- As many as five pairs of start and stop times can be given after the <Count Interval> for various periods which were counted during the same day.

- If counts are already reduced (e.g., not cumulative from interval to interval), one count will exist for each interval counted. For example, one hour of 15-minute counts will have four intervals, say with a start time of 1600 hours and an end time of 1645 hours. If counts are cumulative, an additional interval will exist for each period counted (e.g., 1600 to 1700 hours for the above example).

- All times are for the interval starting at the time stated. If reduced counts are being entered, these time entries are the start time of each interval counted. If cumulative counts are being entered, the times entered are the actual times each count number is recorded. For example, a cumulative count from 4:00 P.M. to 5:00 P.M. would record the first count at 1600, then again at 1615, 1630, 1645, and at the end of the count at 1700.

- If counts for a location are made on separate days, it is suggested that they be input and summarized as separate runs of the program, even if their time periods do not overlap. It is not possible to SUMMARISE, TABULATE, or ANALYZE overlapping time periods for different days; two runs are necessary.

- The PERIODS command values are used to set up the values of other commands such as VEHICLECOUNTS and TRUCKCOUNTS which will be accepted as input. As such, the PERIODS command is active and must be executed. This

sets up the new limits of the counts and opens up the required VEHICLECOUNTS and TRUCKCOUNTS commands in the full-screen displays.

- If <Start Time> and <Stop Time> values of zero are entered for a given time period, all subsequent time periods in the list are deleted.

PERMISSIVES 4*<Permissive Left>

Defaults: 4*NO
Menus/Groups: [PARAMETERS] [INTERSECTION]

The purpose of this command is to enter an option for each approach identifying the permissability of left-turning traffic to turn on a through phase following or preceding an exclusive left turn phase of the current intersection.

<Permissive Left> is the keyword which identifies whether or not left turns are allowed to turn on through phases following or preceding exclusive left turn phases, and can be any of the following:

NO - compound left-turn phasing not allowed (default).
YES - compound left-turn phasing allowed, but restricted to non-trap and single-lane turn lane conditions.
TRAPOK - compound left-turn phasing allowed, even in so-called 'left-turn trap' conditions which are otherwise considered unsafe, but not for multi-lane turn lane conditions.
MULTIOK - compound left-turn phasing allowed, even when the left turn lane consists of more than one lane (multi-lane), but not for left-turn trap conditions. Permitted left operations will also be allowed for multi-lane turn lanes in a single phase when this is selected.
UNRESTRICTED - compound left-turn phasing allowed under any conditions, including left-turn trap and multi-lane conditions.

Notes

- A left-turn trap is a condition where the through movement opposing a left turn continues moving after the left turn's permitted phase ends, possibly leaving a left-turning vehicle stranded in the intersection facing a red indication, or causing the potentially stranded left-turner to think the opposing traffic phase is also ending and making the left turn directly into oncoming traffic. Selecting TRAPOK or UNRESTRICTED allows the program to set the phasing so such a trap condition exists, with the presumption that the analyst is satisfied that the otherwise unsafe condition will be handled safely on the street.

Notes

PHASEMOVEMENTS <Phase Number> <List of Movements>

Defaults:	--	6*0
Menus/Groups:	[PARAMETERS]	[INTERSECTION]

The purpose of this command is to enter the movements permitted during each phase for a non-standard phasing at the current intersection.

<Phase Number> is the number of the phase within the sequence of phases for the following list of movements, and can be 0-6. It has no default and must be entered.

<List of Movements> is the movement number occurring during the specified phase, and can be -12 through 12. Its default value is 0.

Notes

- This is used for phasings that are not included in the standard sequence codes. The use of negative SEQUENCES codes in the range of -1 through -9 is required for the PHASEMOVEMENTS command to define the phasing.

- Movements must receive only one constant green indication during each cycle.

- Negative movement numbers should be used only to indicate permissive lefts following or preceding exclusive left phases. Negative movement numbers should not be used if the only phase the movement is allowed is permitted/opposed.

- If the SHARE option of the LOAD command encounters a PHASEMOVEMENTS command in a data file when the SEQUENCE code is not in the range of -1 through -5, it is ignored without an error. This accounts for the way SIGNAL2000 saves data, since SIGNAL2000 is the likely source of the data being SHAREd. Ignoring the PHASEMOVEMENTS command prevents getting an error message because of this different saving technique. In this case, the current data values of the PHASEMOVEMENTS command remain unchanged.

- The order of input of phases for PHASEMOVEMENTS is not important. The number of phases in the final phasing is determined by the last phase which has a non-zero number of movements in it. Extra phases can be eliminated by entering a movement number 0 as the first movement in the phase. This erases all following movement numbers for that phase and any phases which follow.

- The TIMINGS command can and should be used to review the phasing designated by PHASEMOVEMENTS before further analysis.

PLOT	**<Scale>**	**<List of Nodes>**
Defaults:	0	<Nodelist>
Menus/Groups:	[RESULTS]	[IMPORT]

The purpose of this command is to plot a time-space diagram for the nodes specified.

<Scale> is the scale of the plot in feet per line of output, and can be any integer from 0 to 10,000. Its default value is 0 feet per line (automatic scale to fit the PLOT on one page).

<List of Nodes> is the list of node numbers to be plotted, and can be any node numbers in the specified NODELIST, or the negative value of any defined ROUTE number. The default value is all nodes in the NODELIST or SUBSYSTEM, in the specified order.

Notes

- The NETWORK, GREENTIMES, YELLOWTIMES and OFFSET commands must be specified for each node which is to be PLOTted.

- The output on a printer is normally six lines per inch. When determining the scale to be used for the time-space diagram, this print pitch should be taken into account. For example, if a 600 feet per inch is desired on such a printer, a PLOT scale of 100 (= 600/6) feet per line of output should be used. Similar computations can be made for other combinations of scales and print pitches. The <Scale> of the diagram can also be adjusted in many cases so that the entire time-space diagram will fit into the available screen display or on one page of output (the default).

- The time-space diagram will display approximate speed slope lines in the right margin of the time-space diagram. If the width of the output device (screen or printer) is not adequate to display these lines, they can be relocated into the body of the time-space diagram by inputting a negative <Scale> entry. For example, inputting -100 would display the same time-space diagram as the default, but the speed slope lines would be within the time-space diagram rather than in the right margin. Caution should be used in this case, however, that the position of the speed slope lines is not perceived to represent traffic flow profiles. This interpretation is one best achieved only by a qualified analyst.

- Route numbers can be referenced by use of negative numbers on the PLOT command to quickly identify routes for analysis. For example, if ROUTE 1 is defined by an appropriate ROUTE command, a PLOT for this route can be created through the use of the PLOT * -1 command. This option of the PLOT command can be used even if Release 7 is not the target program.

- <List of Nodes> is limited to 25 intersections in Usage Level 2, and limited to 12 intersections in Usage Level 1.

PROJECT <First Title Line>

Defaults: 80 blanks
Menus/Groups: [TITLES]

The purpose of this command is to enter the first line of information used to identify the situation being analyzed.

<First Title Line> is the first of three lines of information, generally used for the project name, displayed at the top of every output report, and can be up to 80 characters of alphabetic or numeric information. Its default value is 80 blanks.

Notes

- If the first character of the PROJECT parameter is a plus sign, "+", the characters entered on this command will be overlaid over those of the previously entered PROJECT command. This overlay will begin at the character position identified by the digits of the first two characters which follow the "+", and will end after the last non-blank character which is entered. See Chapter 5 of the *TEAPAC Tutorial/Reference Manual* for further explanation and examples of this feature.

- Entries on this command may be enclosed in 'single quotes' or "double quotes". This option provides the capability to include leading blanks in the entry, which is otherwise not possible. This option can also be used to enter a single blank as the title line using a ' ' or " " entry, thereby blanking out the entire prior contents of the title line.

- The name of the current open file can be inserted anywhere in the title line by placing %F at the desired location of the title line. The file name can be placed at a specific column location in a title line by using the +XX form of a title entry noted above.

QUEUEMODELS	**<Model #>**	**<Percentile>**	**<Auto>**	**<Truck>**
Defaults:	1	90	25	40
Menus/Groups:	[PARAMETERS]	[SYSTEM]		

The purpose of this command is to enter parameters which control the queue model calculations used for all intersections under study (for SIGNAL2000 file compatibility only).

<Model #> is the number of the preferred queue model as computed by the QUEUECALCS command, and can be any integer from 1 to 10, but not 2 or 5. Its default value is 1.

1 - HCM	2000 HCM, MBQ, Worst Lane. XXth Percentile Queue
3 - ARRB	ARRB, MBQ, Worst Lane, 95th Percentile Queue
4 - HCM	2000 HCM, MBQ, Worst Lane, Average Queue
6 - MBQ	Historical MBQ, Average Lane, Average Queue
7 - S97E+	SIGNAL97 Evaluate+, MQL, Average Lane, XXth Percentile Queue
8 - S97A+	SIGNAL97 Analyze+, MQL, Average Lane, XXth Percentile Queue
9 - S97E	SIGNAL97 Evaluate, MQL, Average Lane, 90th Percentile Queue
10 - S97A	SIGNAL97 Analyze, MQL, Average Lane, 90th Percentile Queue

<Percentile> is the percentile value desired to be estimated by the queue models, and can be any integer from 50 to 99. Its default value is 90.

<Auto> is the average queue spacing between front bumpers of queued automobiles, in feet, and can be any integer from 5 to 100. Its default value is 25.

<Truck> is the average queue spacing between front bumpers of queued trucks, in feet, and can be any integer from 5 to 100. Its default value is 40.

Notes

- The <Model #> defines the preferred queue model which will be used to calculate queues represented in the ANALYZE and EVALUATE results, as well as the bottom of the QUEUECALCS report.

- See Appendix C for a complete description of each of the queue models which can be computed by SIGNAL2000.

- All models do not support the calculation of any specified percentile value. For example, only a limited set of percentile values can be selected for the HCM model, the ARRB model always uses the 95th percentile, and the original SIGNAL97 models always uses the 90th percentile (see Appendix C).

- All models do not support the calculation of an entered length of autos and trucks. For example, the lengths of autos and trucks for the original SIGNAL97 models always use 25 and 40 feet, respectively (see Appendix C).

- Average lane Models 2 & 5 are no longer separately defined by the 2000 HCM.

REPEAT	**<Variable Name>**	**<First Val>**	**<Last Val>**	**<Increment>**
Defaults:	-	1	1	1
Menus/Groups:	[CONTROL]			

The purpose of this command is to initiate a loop in a control file so that the set of commands which follow will be repeated a finite number of times.

<Variable Name> is the name of the variable to be associated with the loop, and can be any character string beginning with a letter. It has no default value; a variable name must be provided.

<First Val> is the value which will be assigned to the loop variable the first time through the loop, and can be any integer from -32767 to 32767. Its default value is 1.

<Last Val> is the last value which the loop variable will be allowed to have in the loop, and can be any integer from -32767 to 32767. Its default value is 1.

<Increment> is the value which will be added to the loop variable for each pass of the loop in order to increment from <First Val> to <Last Val>, and can be any non-zero integer from -32767 to 32767. Its default value is 1.

Notes

- The end of a REPEAT loop is defined by a GOTO command which has <Variable Name> as its <Destination>.

- Although any character string is allowed as a variable name, only the first letter is used as the actual variable. All following non-blank characters are ignored. If another loop is currently active, its associated loop variable may not be used.

- A REPEAT loop will terminate when the value of the loop variable exceeds the specified <Last Val>. When a loop terminates, the loop variable will have the same value as <Last Val>.

- A negative value for <Increment> is allowed, in which case the loop variable will be decremented until it is less than <Last Val>.

- A limit of five REPEAT loops may be active at any one time (i.e., nested). Any number of sequential loops may be used (i.e., un-nested).

- See the detailed discussion of the various possible uses of the REPEAT loops and control files in Chapter 5 of the *TEAPAC Tutorial/Reference Manual*.

REQCLEARANCES 12*<Required Clearance>

Defaults: 12*4.0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the clearance times required for each movement of the current intersection (for SIGNAL2000 file compatibility only).

<Required Clearance> is the clearance time required for each movement in seconds, and can be any number from 0 to 99.9. Its default value is 4.0.

Notes

- Required clearance times are used only by DESIGN to determine how much clearance time is needed to terminate each phase. This clearance time includes both yellow and all-red clearance. ANALYZE and EVALUATE use the clearance times specified on the YELLOWTIMES command, regardless of the values on REQCLEARANCES.

- It is important to make sure that YELLOWTIMES and REQCLEARANCES entries are always kept consistent with each other, especially when converting Timings by Phase to Timings by Movement and when exporting to third-party, ring-based software.

RESET <List of Commands>

Defaults: [PARAMETERS]
Menus/Groups: [DATAFILES]

The purpose of this command is to reset the parameters of the specified commands to their default values.

<List of Commands> is a set of commands and/or group names, and can be any valid commands or group names of the program. Its default value is [PARAMETERS] - all non-active commands for entry of parameters related to the analysis procedures.

Notes

- The File-New menu does a RESET for [ALL] commands.
- When a RESET [PARAMETERS] command is given, the NEWPAGE YES condition is automatically set. This can be subsequently disabled by the NEWPAGE NO command.
- RESET is not executed when it is encountered during a LOAD which uses the SHARE option.

RETURN --

Defaults: --
Menus/Groups: [CONTROL]

The purpose of this command is to return to the source of input which was being used when the last LOAD command was encountered. It has no parameters.

Notes

- The RETURN command will cause control (the source of input) to be changed from its current location (a file) to the source of the last LOAD command. If the last LOAD was from a file, control is given to the line which follows the LOAD command which caused a source change. If the previous LOAD command was read from the keyboard, control will return to the keyboard.

- If an end-of-file is encountered control is returned to the keyboard, in a similar fashion to a RETURN command. Control is always returned to the keyboard in these cases, however, as this is considered an abnormal condition.

RIGHTTURNONREDS 4*<Right Turn on Red Volume>

Defaults: 4*0
Menus/Groups: [PARAMETERS] [APPROACH]

The purpose of this command is to enter the right turn on red volume for the right turns on each approach of the current intersection.

<Right Turn on Red Volume> is the volume, in vehicles per hour, of right turns being made on red, and can be any integer from 0 to 300. Its default value is 0.

Notes

- The RIGHTTURNONREDS entry defines the permissibility of RTOR with a non-zero entry. As in SIGNAL2000 and the Highway Capacity Manual, the defualt is zero (RTOR not permitted). When non-zero, a permitted movement is defined in every phase of RT 2X where the movement does not already exist. On RT 29, the movement is opposed by the curb lane of the through movement coming from the right-turner's left.

- Note that in the HCM and SIGNAL2000, the RTOR entry describes exactly how many right turn on red movements are made, but in SYNCHRO the number of RTOR movements are estimated by the model. Thus, the only meaning a RTOR entry has in PRESYNCHRO is that a non-zero entry indicates that RTOR is permitted and that SYNCHRO should model conditions that way. Conversely, a RTOR entry of zero indicates RTOR is not permitted and will be modeled as such.

ROUND <Precision of Totals>

Defaults: 1
Menus/Groups: [PARAMETERS] [SITE]

The purpose of this command is to enter the precision to be used in computing the results.

<Precision of Totals> defines the precision of rounding of assignment totals for each intersection movement, and can be any integer from 1 to 1000. Its default value is 1.

Notes

- All computations are calculated to the nearest vehicle until the last computation is completed. At this point, the results for each intersection are rounded to the nearest whole multiple of the rounding precision entered on the ROUND command.

- If multiple computations are being CUMULATED by the COMPUTE command, successive rounding errors can be eliminated by making all the initial calculations and cumulations to the nearest 1 vehicle, except the last, which should be ROUNDed to the desired precision.

ROUTE	**<Route #>**	**<List of Artery Nodes>**
Defaults:	-	-
Menus/Groups:	[PARAMETERS] [SYSTEM] [EXPORT]	

The purpose of this command is to enter a list of node numbers which represent the intersections on the artery for the given route number.

<Route #> is the number of the route which is defined by the following list of artery nodes, and can be any integer from 1 to 8. It has no default value and must be entered.

<List of Artery Nodes> is a list of up to 25 node numbers in the current NODELIST/SUBSYSTEM whose order defines the artery route. It can be any node number in the NODELIST/SUBSYSTEM from 0 to 999. It has no default value and must be entered.

Notes

- Route numbers can be referenced by use of negative numbers on the SUBSYSTEM, PLOT and TIMINGS commands to quickly identify routes for analysis. For example, if ROUTE 1 is defined by an appropriate ROUTE command, a subsystem analysis for only this route can be created through the use of the SUBSYSTEM -1 command (this is only valid in Usage Level 2 versions). Negative route numbers can also be used on the PLOT and TIMINGS commands to list only the nodes in the defined route. This option of the PLOT and TIMINGS commands can be used even if Release 7 is not the target program, and can also be used in Usage Level 1 versions of PRESYNCHRO.

SATURATIONFLOWS 12*<Stream Saturation Flow>

Defaults: 12*0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION]

The purpose of this command is to enter the maximum capacity for each lane group of the current intersection.

<Stream Saturation Flow> is the saturation flow rate for the lane group, in vehicles per hour of green, and can be any integer from 0 to 9999. Its default value is 0.

Notes

- For exclusive left-turn lanes, the saturation flow rate for separate signal control should be used. If no exclusive turn-phase exists, PRESYNCHRO will calculate the appropriate opposed saturation flow rate for TRANSYT7F versions earlier than Release 6.

SAVE	**<Line Number>**	**<File Number>**	**<List of Commands>**
Defaults:	next	next	[PARAMETERS]
Menus/Groups:	[DATAFILES]		

The purpose of this command is to save the current parameter values of the listed commands in permanent storage locations specified by the FILES command, for future retrieval with the LOAD command.

<Line Number> is the line number in the file where the first command in the list is to be saved, and can be any valid line number of the file less than or equal to 32767 (positive, negative or zero). Its default value is the "next line" of the file.

<File Number> is the order number of the desired file on the FILES command, and can be any integer from 1 to 5. Its default value is the "next file" in the file list.

<List of Commands> is a set of commands and/or group names, and can be any valid commands or group names of the program. Its default value is [PARAMETERS] - all non-active commands for entry of parameters related to the analysis procedures.

Notes

- The "next line" default is defined as the line number following the line of the file which was last accessed. This is usually the line number which follows the last information LOADed or SAVEd. When a FILES command is given, the "next line" for the specified file is automatically set equal to one. The "next line" can be changed by use of the NEXTLINES command.

- The "next file" default is defined as the file whose number is one greater than the file number currently in use. The keyboard should be considered file 0 for this purpose. Thus, the default file number for a SAVE from the keyboard is file #1. If a SAVE command is encountered in file #1, its "next file" default is file #2, etc.

- If <Line Number> is entered as 0, the SAVE will start at the "last line". The "last line" is defined as the last point in the file where file access was previously initiated. For example, LOAD 10 followed later by SAVE 0 will "re-SAVE" the information LOADed at line 10 (see Chapter 5 of the *TEAPAC Tutorial/Reference Manual*).

- SAVE will always put a RETURN command into the file after the last command of the list for subsequent LOADs.

- If the first parameter in <List of Commands> is [PARAMETERS], then PROJECT, DESCRIPTION, NOTE, and RESET will be saved in the file at the

specified line number, before the <List of Commands> and RETURN is saved. This is the case when the default condition is used.

- A negative <Line Number> of -n will start the SAVE at a point in the designated file n lines before the default "next line" of the file - i.e., SAVE -5 will start the SAVE five lines prior to the current "next line" of the file. Thus, SAVE -1 will SAVE <List of Commands> on top of the previously saved RETURN command, effectively appending the newly SAVEd information to the end of the previously SAVEd information.

SEQUENCES <Sequence Code> <List of Possible Sequence Codes>

Defaults: 11 ALL
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION] [IMPORT]

The purpose of this command is to enter the desired and allowed phasings of the traffic signal of the current intersection according to the codes defined in Figure 1-2 of Chapter 1.

<Sequence Code> is a sequence code which represents the desired phasing, and can be any valid two-digit code, or -1 through -9. Its default value is 11 - two-phase operation.

<List of Possible Sequence Codes> is a list of two-character sequence codes which represent the possible phasings which are allowed, each of which can be any valid two-digit code, a two-character abbreviation for a list of codes, or ALL. Its default value is ALL - all possible sequence codes.

Notes

- A LEADLAGS entry can be used in addition to the SEQUENCES entry for phasings which are not in the same order as shown on the code sheet. Use PERMISSIVES to add permitted left turns before or after protected left turn phases. Use OVERLAPS to designate right turn overlaps.

- Special abbreviation characters A-D can be used in place of codes 1-8 as shortcuts to represent common lists of phasing possibilities, as noted below:

  A represents codes 1-8
  B represents codes 1-6
  C represents codes 4-6
  D represents codes 7-8

  Thus, a list of 14 15 16 could be entered as a single code 1C, and a list of 11 21 31 41 51 61 could be entered as simply B1. Use DIAGRAMS * to view all the SEQUENCES listed for a given abbreviation made here.

- The use of SEQUENCES -1 through -9 requires use of PHASEMOVEMENTS to identify the movements for each phase.

SIMULATION	**<Steps/Cycle>**	**<Analysis Period>**	**<Stop Penalty>**
	<Link Numbering Method>	**<Model Actuated>**	
	<Assignment Method>		
Defaults:	300	15	-1
	TEAPAC	NO	
	Full		
Menus/Groups:	[PARAMETERS] [SYSTEM]		

The purpose of this command is to enter simulation control parameters, including the length of the analysis period for all intersections under study.

<Steps/Cycle> is the number of increments each cycle will be divided into in the TRANSYT simulation, and can be any value from -300 to 300. The absolute value of the input is the number of steps per cycle. If the value is negative a step-wise simulation is performed; otherwise a standard link-wise simulation is performed. Its default value is 300. It is used by PRETRANSYT only.

<Analysis Period> is the length of the analysis period in minutes, and can be any integer from -999 to 9999. Its default value is 15. It may also be entered as a negative number whose positive value is the number of cycle lengths which define the analysis period.

<Stop Penalty> is the stop penalty to be used in calculating the performance index of the TRANSYT simulation, and can be any value from -1 to 9999. Its default value is -1 to minimize fuel consumption. It is used by PRETRANSYT only.

<Link Numbering Method> is a keyword which describes which link numbering method will be used when creating links for TRANSYT, and can be any of the three following keywords:

TEAPAC	links will be numbered using TEAPAC's normal numbering scheme, counting clockwise around the intersection starting with the right turn on the north approach (default).
TRANSYT	links will be numbered using the scheme described in the TRANSYT-7F user manual.
NEMA	links will be numbered using the alternate NEMA scheme described in the TRANSYT-7F user manual.

<Model Actuated> is a keyword which describes whether the TRANSYT or PASSER actuated model should be used for actuated movements, and can be NO or YES. Its default is NO. It is used by PRETRANSYT and PREPASSR only.

<Assignment Method> is the default method to be used to assign upstream volumes to downstream links if not specified on a NETWORK entry, and can be FULL or LIMITED. Its default value is FULL. It is used by PRETRANSYT only.

Notes

- If the analysis period is anything other than the default of 15 minutes, VOLUMES should be entered as the flow rates in vehicles per hour during this period and PEAKHOURFACTORS should be entered as 1.0.

SITESIZE **<# of Distribution Types>** **<# of Inbound Types>**

Defaults:	0	0
Menus/Groups:	[PARAMETERS] [SITE]	

The purpose of this command is to enter the number of distribution types to be used to describe the inbound and outbound traffic generation.

<# of Distribution Types> is the total number of inbound and outbound distribution types which will be used to define the distribution of trips generated into and out of the site, and can be any integer from 0-150 (see note below). Its default value is 0; it must be entered before any distribution information can be entered.

<# of Inbound Types> is how many of the total distribution types are to be used to define those trips which are destined for the site. These will be the first of the total distribution types, the remainder of which will be declared outbound types. It can be any integer from 0-150, and less than or equal to the <# of Distribution Types>. Its default value is 0.

Notes

- The SITESIZE command must be virtually the first command entered when defining a study network and generator, since no [GENERATOR] or [ASSIGNMENT] commands can be entered until the SITESIZE of the study is defined.

- The maximum size of the study depends on the licensed Usage Level of the program. Usage Level 1 allows up to 50 distribution types, while Usage Level 2 allows up to 100 distribution types, and Usage Level 3 allows up to 150 distribution types.

- In the Manual Mode, <# Inbound Types> does not need to be entered. If it hasn't been entered, its default value will be one-half of the total number of distribution types, set only after <# of Distribution Types> is first entered. Its value cannot exceed the entered <# of Distribution Types>.

- It is possible to declare 0 distribution types on the SITESIZE command so that all subsequent calculations only apply to defined non-site VOLUMES and appropriate growth VOLFACTORS. This is particularly useful when calculating non-site volumes separately from a set of cumulated multi-site volumes, in order to separate the non-site volume definitions completely from any of the site traffic.

- The SITESIZE command can specify that all of the declared distribution types are either all inbound or all outbound. This effectively increases the number of inbound or outbound distribution types in a single calculation from a maximum of 15 to a maximum of 30 (in the largest SITE distribution Usage Level). All types

in a given calculation can be inbound, followed by a cumulated calculation of all outbound types.

STARTUPLOST 12*<Startup Lost Time>

Defaults: 12*2.0
Menus/Groups: [PARAMETERS] [MOVEMENT]

The purpose of this command is to enter the length of the lost time at the beginning of a movement's green period for each of the twelve movements of the current intersection.

<Startup Lost Time> is the number of seconds which is not used at the beginning of a movement's green period, and can be any number from 0.0 to 30.0. Its default value is 2.0.

Notes

- STARTUPLOST and ENDGAIN entries are now used to define an explicit amount of startup lost time and end gain time for each individual movement of each intersection. Their usage replaces the prior usage of the system-wide lost time value found on the LOSTTIMES entry, and permits better modeling of movement-specific conditions and consistency with the Highway Capacity Manual. These values are coded directly on the appropriate RT 29 entries.

- The default values of STARTUPLOST and ENDGAIN (both equal to 2 seconds) will be used unless otherwise changed by the user. This is particularly the case when an older data file is used in which a LOSTTIMES value in the file is found and ignored. The user should note that in these cases the resulting lostime value will be equal to the entered YELLOWTIME value. Since the prior default for LOSTTIMES was 3 seconds and it is not common to find a YELLOWTIME value of 3 seconds, the net result is that in these cases the lost time which results from default entries is likely to increase from prior analyses, resulting in reduced effective green time and likely increased delay.

STOP <Next Program>

Defaults: --
Menus/Groups: [CONTROL]

The purpose of this command is to stop running the current program and optionally run a new program.

<Next Program> is the name of another program which is to be run following the end of the current program, and can be any valid program name. Its default value is blanks; no program will be run following the end of the current program.

Notes

- <Next Program> may also include a file name to be used by the named program.

- The command QUIT may be used in the Manual Mode as an alias command to represent the STOP command. It cannot be used in any <List of Commands> entries such as with ASK or HELP.

STORAGE 12*<Storage Distance>

Defaults: 12*0
Menus/Groups: [PARAMETERS] [MOVEMENT]

The purpose of this command is to enter the amount of storage distance for queued vehicles for each of the twelve movements of the current intersection.

<Storage Distance> is the distance, in feet, which can be used to store a queue of vehicles without obstructing vehicles in other lane groups or at other intersections, and can be any integer from 0 to 9999. Its default value is 0.

Notes

- The appropriate field for the queue capacity entry on RT 28 is filled in, as calculated from the STORAGE, LANES and TRUCKPERCENTS entries.

SUBSYSTEM 100*<Node Number>

Defaults: 100*0
Menus/Groups: [PARAMETERS] [SYSTEM] [EXPORT]

The purpose of this command is to enter the subset of the NODELIST for which subsequent actions should be taken.

<Node Number> is a unique number assigned to each intersection on INTERSECTION command, and can be any integer from 0 to 999 or the negative value of any defined route number. Its default value is 0.

Notes

- This is one of several entries (including NODELIST, SUBSYSTEM, INTERSECTION, NODELOCATION and NETWORK) which can be made or might be altered when using the drag-and-drop network creation/editing functions in the main window. Entries made from a dialog will change the values created in the main window, and vice-versa.

- The SUBSYSTEM command allows a subset of the complete NODELIST to be exported to SYNCHRO in Usage Level 2+ versions of PRESYNCHRO. This means that the entire network (up to 500 signals) may be LOADed into PRESYNCHRO, then only the pertinent signals are exported to SYNCHRO. This allows for extremely efficient testing of various potential subsystem boundaries. Single intersection analyses with SYNCHRO may also be executed using SUBSYSTEM to select only one signal.

- Like NODELIST, the entry of a 0 node in the SUBSYSTEM list will terminate the SUBSYSTEM list of nodes and zero out any subsequent nodes in the list.

- In Usage Level 2, SUBSYSTEM can be as many as 100 nodes in length. In Usage Level 3, SUBSYSTEM can be as many as 500 nodes in length.

- When in the Visual Mode or using the ASK command to enter the SUBSYSTEM command, only 12 intersections can be entered. If a subsystem of more than 12 intersections must be entered, use the Manual Mode to make the original entry or any future edits, using ampersands (&) to continue long command lines to the subsequent entry line. When using the Visual Mode, only the first 12 entries may be entered or modified.

- The order of entries on SUBSYSTEM has no effect on the order that the intersections are EXPORTed to SYNCHRO. The NODELIST defines this order.

- Route numbers can be referenced by use of a negative number on the SUBSYSTEM command to quickly identify a route for analysis. For example, if ROUTE 1 is defined by an appropriate ROUTE command, a subsystem analysis for only this route can be created through the use of the SUBSYSTEM -1 command. This option can be used even if Release 7 is not the target program.

SUMMARISE --

Defaults: --
Menus/Groups: [DATAFILES]

The purpose of this command is to display a formatted summary of all [PARAMETERS] values. It has no parameters.

Notes

- SUMMARISE is similar in function to DATA, but provides better column organization and section headings, where DATA only lists the current data values for each command. DATA, on the other hand, allows selection of which command's data to view, and can sometimes save time, whereas SUMMARISE will always display all data values.

- The SUMMARISE command is spelled with an 'S' at the end in order that it does not conflict with the typical command SIZE. If SUMMARISE were spelled with a 'Z', then typing the full command SIZE would still be an ambiguous abbreviation for both the SIZE and SUMMARIZE commands, and the SIZE command could never be executed.

TIMINGS <List of Nodes>

Defaults: <Nodelist>
Menus/Groups: [RESULTS] [IMPORT]

The purpose of this command is to display the phasing and timings defined for each intersection in the list of nodes, including the system offset value.

<List of Nodes> is a list of node numbers to be displayed, and can be any number in the specified NODELIST, or the negative value of any defined ROUTE number. Its default value is all nodes in the NODELIST or SUBSYSTEM, in the specified order.

Notes

- VOLUMES must be defined for each intersection in order that the phasing diagram which is displayed shows the actual movements which move during each phase. The NETWORK, WIDTHS and SATURATIONFLOWS need not be entered for TIMINGS to operate properly.

- Route numbers can be referenced by use of negative numbers on the TIMINGS command to quickly identify routes for display. For example, if ROUTE 1 is defined by an appropriate ROUTE command, a TIMINGS for this route can be created through the use of the TIMINGS -1 command. This option of the TIMINGS command can be used even if Release 7 is not the target program.

TRUCKCOUNTS	**<Movement or Time>**	**<List of Counts>**
Defaults:	none	(zeros)
Menus/Groups:	[PARAMETERS]	[TURNS/WARRANTS]

The purpose of this command is to enter the count of trucks for a count interval or movement number at the current intersection.

<Movement or Time> is the movement number or the beginning time of the time interval for the counts to be entered, and can be any of the following:

1-12 (Movement number), or
0-2400 (Beginning time)

This parameter has no default value, and must be entered each time the TRUCKCOUNTS command is used.

<List of Counts> is the list of counted trucks for the specified movement number or time interval, and can be any number from -999 to 9999. Its default value is 0, e.g., it must be entered.

Notes

- Movement numbers begin with the north leg right-turn and proceed clockwise around the intersection. If a movement number is given for the first parameter, the counts should be for that movement only, one for each interval in each of the periods. If a time is given, twelve counts for each of the movements at that time should follow. Use of the movement number option is limited to the Manual Mode only.

- Usually, for capacity analysis purposes, vehicles with 6 or more tires or 3 or more axles should be considered trucks (heavy vehicles).

- All counted trucks entered by this command may either be included or not included in the counts on the VEHICLECOUNTS command. This is determined by the second parameter of the COUNTTYPE command.

- Truck counts may not exceed 9999. Input should always be no more than four digits. If cumulative counts are made with five-digit counters, only enter the last four digits. When cumulative counts are being reduced, if the difference is negative (the counter turned over the 9999 mark to 0000), TURNS automatically adds 10,000 to the negative result.

TRUCKPERCENTS 12*<Truck-Through Bus Percentage>

Defaults: 12*2
Menus/Groups: [PARAMETERS] [BASIC] [MOVEMENT]

The purpose of this command is to enter the truck and through bus (heavy vehicle) traffic percentage for each movement of the current intersection.

<Truck-Through Bus Percentage> is the percentage of trucks and through buses in each movement volume, and can be any number from 0 to 99.9. Its default value is 2.0.

Notes

- TRUCKPERCENTS includes any designated "heavy vehicles", as defined by the 2000 *Highway Capacity Manual*.

UPSTREAMVC 4*<Upstream v/c Ratio>

Defaults: 4*0.0
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the v/c ratio of the upstream intersection for each approach of the current intersection (for SIGNAL2000 file compatibility only).

<Upstream v/c Ratio> is the v/c ratio of the upstream intersection, and can be any number from 0.0 to 3.0. Its default value is 0.

Notes

- Note that although many intersections in a network may be entered into SIGNAL2000, the upstream v/c is a user entry and is not determined by the program based conditions in other parts of the network.

UTILIZATIONS 12*<Lane Utilization Factor>

Defaults: 12*0.00
Menus/Groups: [PARAMETERS] [SIGNAL2000]

The purpose of this command is to enter the lane utilization factor for each movement of the current intersection (for SIGNAL2000 file compatibility only).

<Lane Utilization Factor> allows the specification of non-uniform lane usage, and can be any number from 0.00 to 1.00. Its default value is 0.00 (see below).

Notes

- If an input value of 0.00 is made (the default), this indicates a desire by the user for the 2000 *Highway Capacity Manual* default values to be used.

- Specifying a value of 1.00 indicates the desire to evaluate the overall performance of the lane group, not the heaviest-traveled lane of the lane group.

- Lane utilizations are used to determine the adjusted saturation flow rate for use in the v/c and delay calculations, as well as queues. As such, caution should be used in applying lane utilization factors substantially less than 1.00 since in these cases the analysis is only valid for the heaviest-traveled lane (not the entire lane group), and this aspect of the analysis may be overlooked by those looking at the analysis summary.

VEHICLECOUNTS	<Movement or Time>	<List of Counts>
Defaults:	none	(zeros)
Menus/Groups:	[PARAMETERS]	[TURNS/WARRANTS]

The purpose of this command is to enter the count of vehicles for a count interval or movement number at the current intersection.

<Movement or Time> is the movement number or the beginning time of the time interval for the counts to be entered, and can be any of the following:

1-12 (Movement number), or
0-2400 (Beginning time)

This parameter has no default value, and must be entered each time the VEHICLECOUNTS command is used.

<List of Counts> is the list of counted vehicles for the specified movement number or time interval, and can be any number from -999 to 9999. Its default value is 0, e.g., it must be entered.

Notes

- Movement numbers begin with the north leg right-turn and proceed clockwise around the intersection. If a movement number is given as the first parameter, the counts should be for that movement only, one for each interval in each of the periods. If a time is given, twelve counts for each of the movements at that time should follow. Use of the movement number option is limited to the Manual Mode only.

- If the truck COUNTTYPE is INCLUDED, all counted vehicles should be included in these entries, including any trucks specified by the TRUCKCOUNTS command. If the truck COUNTTYPE is SEPARATE, VEHICLECOUNTS should be all vehicles except trucks, which will be entered only on the TRUCKCOUNTS command.

- Vehicle counts may not exceed 9999. Input should always be no more than four digits. If cumulative counts are made with five-digit counters, only enter the last four digits. When cumulative counts are being reduced, if the difference is negative (the counter turned over the 9999 mark to 0000), TURNS automatically adds 10,000 to the negative result.

VOLADDITIONALS <AddFactor> 12*<Additional Volume>

Defaults: 1 12*1.00
Menus/Groups: [PARAMETERS] [INTERSECTION]

The purpose of this command is to enter the factor and additional volume to be added for each movement at the current intersection.

<AddFactor> is the factor which is multiplied by each <Additional Volume> entered to get the total additional volume added to each movement, and can be any number from 0.0 to 20.0. Its default value is 0.00 (no additional volumes added).

<Additional Volume> is a volume of additional traffic to be added to the entered volumes, as adjusted by the <AddFactor>, and can be any number from -9999 to 9999. Its default value is 0.

Notes

- Normally <AddFactor> will have a value of 0.0 or 1.0 to disable or enable, respectively, any <Additional Volumes> which have been entered, without the need to actually change the <Additional Volume> entries. This feature makes it easy to add and remove additional volumes from an analysis. <AddFactor> may also be used as a multiplier for the <Additional Volumes> for easy testing of incremental values of additional volumes.

- See the discussion in Appendix C (Calculation of Volumes) for a complete discussion of how VOLUMES, VOLFACTORS, VOLADDITIONALS and PEAKHOURFACTORS are used to generate analysis volumes for various types of analyses within TEAPAC.

VOLFACTORS <# Years> 12*<Adjustment Factor>

Defaults: 1 12*1.00
Menus/Groups: [PARAMETERS] [INTERSECTION]

The purpose of this command is to enter number of times to compound and each multiplier used for each movement to adjust the volume or count data entered at the current intersection.

<# Years> is the number of times (years) to compound each multiplier, and can be any positive integer from 1 to 99. Its default value is 1 (no compounding).

<Adjustment Factor> is a multiplier used to adjust the movement volumes or counts input to the program, and can be any number from 0.0 to 9.99. Its default value is 1.00 (no adjustment).

Notes

- If a number greater than one is entered for the <# Years>, the <Adjustment Factor> will be taken as an annual growth factor for entered traffic volumes or counts, applied for each of the years entered. For example, if the growth rate is 2 percent per year over 3 years, a VOLFACTORS 3 1.02 entry would be made to effect a 1.0612 adjustment to entered volumes or counts (=1.02 x 1.02 x 1.02).

- The use of VOLFACTORS will adjust all volumes displayed in the output reports by the specified factors. It will not change the volume or count values entered. This is a convenient way to adjust traffic count data for seasonal variations in count data or to apply a projected growth factor

- VOLFACTORS can also be used to project growth of traffic at the intersection, for example, if the count is several years old and must be used for a current study or to project a future volume condition.

- See the discussion in Appendix C (Calculation of Volumes) for a complete discussion of how VOLUMES, VOLFACTORS, VOLADDITIONALS and PEAKHOURFACTORS are used to generate analysis volumes for various types of analyses within TEAPAC.

VOLUMES 12*<Design Hour Volume>

Defaults: 12*0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION]

The purpose of this command is to enter the turning and through movement volumes for each of the movements at the current intersection.

<Design Hour Volume> is a volume, in vehicles per hour, for the movement, and can be any integer from 0 to 9999. Its default value is 0.

Notes

- A volume of 0 indicates the movement is prohibited at the intersection - allowed movements with no measured activity should show at least 1 vehicle per hour.
- Note that the VOLUMES entered will be factored up for analysis by SYNCHRO according to the PEAKHOURFACTORS entries made for each movement.
- See the discussion in Appendix C (Calculation of Volumes) for a complete discussion of how VOLUMES, VOLFACTORS, VOLADDITIONALS and PEAKHOURFACTORS are used to generate analysis volumes for various types of analyses within TEAPAC.

WIDTHS 12*<Lane Group Width>

Defaults: 12*0.0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION]

The purpose of this command is to enter the width of the lane group for each movement at the current intersection.

<Lane Group Width> is the the width, in feet, of the lane group for each movement, and can be in the range of 0.0 - 60.0 feet. Its default value is 0.0 feet.

Notes

- Widths for turning movements should be entered only if the approach has exclusive turning lanes. If no turning lanes exist, the turns will come out of the designated through lane group.

YELLOWTIMES 6*<Phase Yellow Time>

Defaults: 6*0.0
Menus/Groups: [PARAMETERS] [BASIC] [INTERSECTION] [IMPORT]

The purpose of this command is to enter the clearance interval at the end of each phase of a phase sequence, or optionally for each of the movements, of the current intersection.

<Phase Yellow Time> is the duration of the clearance interval after each phase or movement in seconds or seconds/second, and can be any number from 0 to 900. Its default value is 0.0 seconds.

Notes

- If the list of YELLOWTIMES is preceded by the keyword 'Movmt', then each of the entered values will be interpreted as timings for individual through and left turn movements, clockwise around the intersection. If not, or the optional keyword 'Phase' is used, each value is for the phases defined by the SEQUENCE code.

- When entering or viewing controller timings, a Convert button appears on the YELLOWTIMES dialog which allows the user to select the style of entry or view, either 'By Phase' which is the traditional HCM method, or 'By Movement' which is more similar to the way timings are used on NEMA and other dual-ring controllers. If any timings are present, they will be converted to the other format at the same time, including YELLOWTIMES if the GREENTIMES dialog is displayed, and vice versa. When timings are Converted, the conversion will also include reviewing the allowed SEQUENCES list and moving the appropriate sequence code to the top of the list according to the timings present.

- It is important to make sure that YELLOWTIMES and REQCLEARANCES entries are always kept consistent with each other, especially when converting Timings by Phase to Timings by Movement and when exporting to third-party, ring-based software.

- 'By Movement' timings are not allowed when special phasings represented by negative SEQUENCE codes are used.

- If entering YELLOWTIMES by phase, they must be entered in the order of the phases as specified in the SEQUENCES and LEADLAGS commands.

- All-red time should be included in the YELLOWTIMES command.

- If all YELLOWTIMES are entered in seconds/second, the first cycle length of the CYCLES command will be used to convert the phase clearance times to seconds. Normally, YELLOWTIMES should be entered in seconds.

- If all entries are greater than or equal to 1.0, they are assumed to be seconds; if all entries are less than 1.0, they are assumed to be seconds/second.

- When EXPORTing to SYNCHRO for a split or cycle optimization, YELLOWTIMES may be omitted, in which case the time for each clearance interval in SYNCHRO will be set to a default value of 4 seconds. In the event that an overlap phase's green and yellow times are both zero, the clearance time is set to the minimum value of 1 second rather than the 4-second default.

- If a signal is to be double-cycled, GREENTIMES, YELLOWTIMES (and OFFSETS) must be entered in seconds (not sec/sec) which sum to 1/2 the system cycle.

APPENDIX C

Analysis Methods and Formulations

Appendix C Topics

The following describes the various methods and formulations which are used in the PRESYNCHRO program.

Appendix C Topics

Appendix C Introduction
Calculation of Volumes

Calculation of Volumes

In the simplest form, a user enters volumes (V) for each intersection movement with the VOLUMES dialog and these volumes are used in any subsequent analyses which requires a measure of traffic demand. These volumes are provided in vehicles per hour and frequently they represent the average hourly flow rate (or equivalently, the hourly count) for the hour to be analyzed. Since the *Highway Capacity Manual* (HCM) dictates that the normal analysis period is to be 15 minutes, the PEAKHOURFACTORS entry (PHF) is then used to estimate the flow rate (v) during the peak 15 minutes of the hour for which the average hourly volume is entered.

$$v = V / PHF$$

where: v = analysis flow rate during peak 15 minutes of the hour (vehicles per hour)
V = entered average hourly VOLUME during the hour (vehicles per hour)
PHF = 15-minute peak hour factor (ratio of average flow to peak 15-minute flow)

If the actual peak 15-minute flow rate (vph) is known and entered as the VOLUMES entry (e.g., a 15-minute count multiplied by four), then the PEAKHOURFACTORS entry should be set to 1.0 so that v = V above and the entered VOLUME will become the analysis flow rate.

In order to facilitate sensitivity and alternative analyses, the VOLUMES entry can be modified by two other related entries. First, the VOLFACTORS entry can be used to multiply each VOLUMES entry by a factor. This is simply a multiplicative factor, either to inflate or deflate

the entered volume. It is entered in such a way that it can also be interpreted as a growth factor if such an interpretation is appropriate. First, a number of years (N) is entered which applies to all VOLFACTORS for the intersection, then individual factors (f_V) are given for each movement. The entry for number of years (N) is actually the number of times the individual factors (f_V) will be compounded, in which case the entered factor (f_V) can be more generally interpreted as a periodic growth factor and the number of years (N) can be interpreted as the number of periods which the growth factor (f_V) is compounded.

$V' = V * (f_V ** N)$

where: V' = factored average hourly volume for analysis (vehicles per hour)
V = entered average hourly VOLUME during the hour (vehicles per hour)
f_V = entered VOLFACTOR adjustment factor (for each N periods)
N = entered VOLFACTOR number of periods to compound the f_V factor

If a simple inflation or deflation factor is all that is required, the number of years should be entered as N = 1, in which case $V' = V * f_V$ above.

A second volume adjustment entry can be made via the VOLADDITIONALS dialog. This is an additive value above and beyond the adjustment described above for VOLFACTORS. First, a factor (f_{add}) is entered which applies to all additional volumes for the intersection, then individual additional volumes (V_{add}) are given for each movement. In its simplest form, the factor entered is either 0 (zero) or 1 (one) to either exclude or include the additional volumes given, repectively. This makes it easy to leave the additional volume entries but remove and/or re-include them in the analysis with a single factor entry. In its broadest application, the entered factor (f_{add}) can be used to inflate or deflate the additional volume entries (V_{add}) by the factor entered.

$V' = V + V_{add} * f_{add}$

where: V' = adjusted average hourly volume for analysis (vehicles per hour)
V = entered average hourly VOLUME during the hour (vehicles per hour)
V_{add} = entered VOLADDITIONAL additional volume
f_{add} = entered VOLADDITIONAL adjustment factor

Thus, in the most general form, the demand volumes used for an analysis are determined using the following formula:

$v = (V * (f_V ** N) + V_{add} * f_{add}) / PHF$

where: v = analysis flow rate during peak 15 minutes of the hour (vehicles per hour)
V = entered average hourly VOLUME during the hour (vehicles per hour)
f_V = entered VOLFACTOR adjustment factor (for each N periods)
N = entered VOLFACTOR number of periods to compound the f_V factor
V_{add} = entered VOLADDITIONAL additional volume
f_{add} = entered VOLADDITIONAL adjustment factor

PHF = 15-minute peak hour factor (ratio of average flow to peak 15-minute flow)

The TURNS and WARRANTS programs of TEAPAC can determine peak-hour or peak-15-minute volumes from entered traffic count data using the ANALYZE function. In these programs, entered VOLUMES and VOLADDITIONALS are ignored by ANALYZE and the results of the peak analysis are placed in the VOLUMES entries automatically. VOLFACTORS are applied to the traffic count data as 'growth' or 'seasonal' adjustment factors, thus the resulting automatic VOLUMES entries have these same VOLFACTORS removed so that the calculation of analysis volumes from the general formula above will result in the same peak volumes determined by the ANALYZE function. For example, if count data is analyzed with a VOLFACTORS growth factor of 10% (f_V = 1.10 and N = 1) and results in a peak volume of 110 vph, the corresponding VOLUMES entry will be set to 100 vph so that the VOLFACTORS entry will inflate the VOLUME to 110 for analysis. PEAKHOURFACTORS are also set according to the specification of the TURNS or WARRANTS OUTPUT dialog, as are TRUCKPERCENTS. VOLADDITIONALS entries are unaffected by the ANALYZE results.

The SITE program of TEAPAC can estimate future volumes due to the impact of certain specified development scenarios. In this program, the VOLUMES entries are used as the background traffic for the complete scenario assessment by the COMPUTE function, including the effect VOLFACTORS has on these background VOLUMES. VOLADDITIONALS, however, have no effect on the computations, and the results of the scenario computations are placed in the VOLADDITIONALS entries automatically (with the contribution of VOLUMES and VOLFACTORS removed) so that the calculation of analysis volumes from the general formula above will result in the same volume scenario determined by the COMPUTE function. For example, if a counted movement VOLUME is 100 and the background traffic growth VOLFACTOR entry is 1.10 (f_V = 1.10 and N = 1), resulting in 110 vph projecterd background traffic, and the computed total traffic for that movement under a given development scenario is 250 vph, the VOLADDITIONAL entry will be 140 vph (with f_{add} = 1.0) so that the computed analysis volume for subsequent analyses will result in 250 vph.

In summary, analysis volumes are computed for performance assessments and design functions as the combination of entered volumes (VOLUMES), 'growth' factors (VOLFACTORS) and additive volumes (VOLADDITIONALS), and adjusted by peak hour factors (PEAKHOURFACTORS). VOLUMES and PEAKHOURFACTORS (and TRUCKPERCENTS) can be determined directly by TURNS and WARRANTS from traffic count data, including the effect of 'growth' or 'seasonal' factors (VOLFACTORS) and ignoring any entered VOLUMES, PEAKHOURFACTORS or VOLADDITIONALS (or TRUCKPERCENTS). VOLADDITIONALS can be determined directly by SITE for development scenarios, including the effect of 'growth' factors (VOLFACTORS) on any entered VOLUMES and ignoring any entered VOLADDITIONALS. This process makes for a completely seamless integration of all of the TEAPAC programs with respect to consistent traffic volumes used by each program.

APPENDIX D

Report Descriptions and Examples

Appendix D Topics

This appendix describes each of the major output reports which can be produced by the PRESYNCHRO program. The reports are discussed, followed by an example output, in the order indicated in Table D-1. The table includes the report title and the primary command associated with the contents of the report. The report title and primary command for each report appear at the top of each page of the appendix for easy reference.

Each of the outputs presented in this appendix was created using the example data included in the sample file named PRESYNCH.FOR. These results can be re-created by opening this file (found in the installed program folder) and executing a LOAD command with default parameters from the File-Datafiles menu. The reports shown here are the text-only versions of the output in order to reduce the size of the downloadable programs, demos, updates, help files and .pdf manuals. Using the LOAD command above will, by default, produce the far superior-looking graphical output reports whose inclusion herein would vastly increase the size of the downloads mentioned.

Opening the file reads in the basic data for the examples of this appendix. The LOAD command will produce the output reports contained in this appendix by reading a control file script stacked in the file after the input data. This procedure is a good way to verify the operation of the program, as well as to create a starting point for further experimentation with the PRESYNCHRO program. The data used in the example outputs is summarized in the first output example, Summary of Parameter Values. Each report description that follows includes all of the commands which can be used to generate the report.

Table D-1
Report Descriptions and Examples

Report Title	Keyword
Summary of Parameter Values	SUMMARISE
SYNCHRO Formatted Input	EXPORT
Time-Space Diagram for Cycle = XX sec	PLOT
Timings for Intersection XX	TIMINGS
SYNCHRO Imported Data	IMPORT

Appendix D Topics

Appendix_D_Introduction
PRESYNCHRO/TEAPAC - Summary of Parameter Values
PRESYNCHRO/TEAPAC - SYNCHRO Formatted Input
PRESYNCHRO/TEAPAC - Time-Space Diagram for Cycle = XX sec
PRESYNCHRO/TEAPAC - Timings for Intersection XX
PRESYNCHRO/TEAPAC - SYNCHRO Imported Data

PRESYNCHRO/TEAPAC - Summary of Parameter Values

The Summary of Parameter Values report, generated using the SUMMARISE command, is a compilation of the data required to analyze network progression, recognizing all the pertinent information required by the SYNCHRO program. It is divided into two report sections, the first for system parameters, and a section of intersection parameters for each intersection. The contents of these two sections are discussed below.

System Parameters

The System Parameters are those parameters which define parameter values for the entire system or network. These values are entered only once for the system.

Simulation Period. The length of time, in minutes, of the simulation period.

Steps per TRANSYT Cycle. The number of incremental steps to be used to simulate the performance during each cycle period.

Actuated Model. Describes whether TRANSYT's actuated model will be used for actuated movements.

Default Link Assignment Method. The link assignment method which will be used on any given link where a link-specific assignment method has not been selected.

Optimization Type. The parameters to be optimized such as cycle, splits and/or offsets, or a user-specified list. NONE indicates simulation only. If LIST is specified, the list of numbers represents the optimization step sizes to be used by TRANSYT. Otherwise, the first three numbers represent the PI, DI and PROS/DI parameters of the Card Type 5X.

List of Intersection #'s in Network. The list of valid node numbers that are to be included in the study network. The Master Node represents which of these is the master location or master offset for the system, if not 0.

List of Intersection #'s in Defined Routes. The list of node numbers that are included in each of the defined artery routes for the system. These are used by the PROS optimization and artery summary outputs.

List of Intersection #'s in Subsystem. The list of node numbers that are to be included in the simulation or optimization. If no list appears, all nodes of the network list will be included in the analysis. A negative number represents the negative value of the route number which will be used for the SUBSYSTEM definition.

Specified List of Links to be Simulated. The list of links, in simulation order, that are to be simulated for the network. If no list appears, all possible links will be included in the simulation.

Intersection Parameters

The Intersection Parameters are those parameters which define an individual intersection within the network. These parameters are used by PRESYNCHRO to generate the actual SYNCHRO network.

Intersection #. The intersection node number and description of the intersection. The node number is as appears in the system node list above.

Demand Volumes. The design hour volumes, in vehicles per hour, at the intersection for each of the twelve possible movements at the intersection.

Peak Hour Factors. The peak hour factors for each of the twelve possible movements at the intersection.

Truck Percentages. The percentage of heavy vehicles in the traffic stream for each of the twelve possible movements at the intersection.

Right Turn on Red. The volume of right turn on red maneuvers made per hour for each right turn at the intersection. For PRESYNCHRO, a non-zero entry simply indicates the RTOR is permitted.

Approach Widths. The widths of pavement available for each of the twelve movements at the intersection. If no exclusive turn lane exists, a width of zero is shown for the turn movement.

Number of Lanes. The number of lanes included in the above width for each lane group at the intersection.

Lane Group Type. The type of lane group designated for each lane group above, including Normal, FreeFlow, DualOptional, Stop controlled or Yield controlled.

Saturation Flow. The maximum release flow rate, in vehicles per hour of green, for each lane group of the intersection. Each non-zero width requires a non-zero saturation flow rate.

Minimum Green. The minimum green time, in seconds, required for safe passage of each of the twelve movements.

Actuated Movements. A NO or YES flag which indicates whether each movement of the intersection is part of an actuated phase.

Startup Lost Time. The number of seconds of startup lost time at the beginning of green indications for each lane group at the intersection.

End Gain Time. The number of seconds of end gain time at the end of green indications for each lane group at the intersection.

Storage. The distance in feet for each lane group of the intersection in which stored vehicles can wait without impacting other lane groups of the intersection or system.

Phasing/Order. A two-digit code representing the basic phasing of the traffic signal is followed by the order codes. For multi-phase signal operation, the order indicates whether turning phases lead ahead of or lag behind the through phase. The first entry is for the north-south phases, the second is for the east-west phases.

Permissives. Denotes whether left turns are allowed to move on a permitted through phase following an exclusive left turn phase. If the phasing is single phase for the left turn, the movement is permitted regardless of the permissives setting.

RT Overlaps. Denotes whether right turns are allowed to overlap into adjacent left turn phases when an exclusive right turn lane exists.

Greentimes. The green time, in seconds, for each signal phase, in the order of the designated Sequence and Leadlag entries. Numbers less than 1.00 represent proportions of the system cycle time, in seconds/second.

Yellowtimes. The yellow time, in seconds, for each signal phase, in the order of the designated Sequence and Leadlag entries.

Cycle Length. The cycle length, in seconds, for the intersection. This is also the minimum cycle length if a cycle range is given.

Max Cycle. The maximum cycle length, in seconds, which will be searched in a cycle range evaluation.

Cycle Increment. The increment of cycle length, in seconds, which will be used in a cycle range evaluation to get from the minimum cycle to the maximum cycle.

Offset. The system progression offset for the phasing, and the phase number to which this offset applies. Numbers less than 1.00 represent proportions of the system cycle time, in seconds/second.

Network Data. The description of the location of the intersection in the network being analyzed. For each approach to the intersection, this includes the distance in feet from the upstream node, the average travel speed from the upstream node, the node number of the upstream node, and the movements numbers at the upstream node which supply traffic to the downstream node, the link assignment method, the link curvature, and if the link distance has been manually entered. The X,Y coordinates of the node are also given.

The following is an example of the Summary of Parameter Values text-only report using the PRESYNCHRO program sample data. The normal full-color graphics version of the report

contains the same results formatted with superior layout, fonts and graphics (it is not included here to keep the size of the downloadable program/demo/update/help/pdf files to a minimum).

PRESYNCHRO/TEAPAC[Ver 1.71.07] - Summary of Parameter Values

SYSTEM PARAMETERS
==========

Simulation Period of 15 minutes, 300 Steps per TRANSYT Cycle
Use actuated model? No, Default link assignment method: Full

List of Intersection #'s in Network: (Master Node is 13)
13 14 15

List of Intersection #'s in Defined Routes:
Route 1: 13 14 15

INTERSECTION # 13 MacArthur & Pershing
==========

MOVEMENT DATA	North			East			South			West		
	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt
Demand Volumes	122	216	80	79	722	187	212	310	198	139	660	134
Peak Hr Factors	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck Percents	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Rt Turn on Red	0			0			0			0		
Approach Widths	0.0	24.0	0.0	0.0	24.0	12.0	0.0	24.0	12.0	0.0	24.0	12.0
Number of Lanes	0	2	0	0	2	1	0	2	1	0	2	1
Lane Group Type	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm
Saturation Flow	0	2410	0	0	2771	1433	0	2337	1433	0	2525	1448
Minimum Green	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Actuated Movmts	No	No	No	No	No	No	No	No	No	No	No	No
Startup Lost	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
End Gain	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Storage	0	0	0	0	0	0	0	0	0	0	0	0

SIGNAL CONTROL					Phase					
					1	2	3	4	5	6
Phasing/Ordr	12	No	Ld	Greentimes	0.320	0.140	0.390	0.000	0.000	0.000
Permissives	Ys	Ys	Ys	Yellowtimes	3.00	3.00	3.00	0.00	0.00	0.00
RT Overlaps	Ys	Ys	Ys	Cycle(s)	60	60	30			
				Offset	0.65 to start of Phase 2					

NETWORK DATA

	Dist	Spd	Node	Movements				Asg	Crv	Man	X-Coord	Y-Coord
N Approach	0	0	0	0	0	0	0	Def	No	No	0	0
E Approach	2130	35	14	5	9	1	0	Def	No	No		
S Approach	0	0	0	0	0	0	0	Def	No	No		
W Approach	0	0	0	0	0	0	0	Def	No	No		

PRESYNCHRO/TEAPAC[Ver 1.71.07] - Summary of Parameter Values

INTERSECTION # 14 Main & Pershing

MOVEMENT DATA	North			East			South			West		
	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt
Demand Volumes	150	813	244	0	1296	589	0	0	0	386	620	0
Peak Hr Factors	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck Percents	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Rt Turn on Red	0			0			0			0		
Approach Widths	0.0	48.0	0.0	0.0	24.0	24.0	0.0	0.0	0.0	12.0	24.0	0.0
Number of Lanes	0	4	0	0	2	2	0	0	0	1	2	0
Lane Group Type	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm
Saturation Flow	0	5296	0	0	3041	2606	0	0	0	1448	2634	0
Minimum Green	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Actuated Movmts	No	No	No	No	No	No	No	No	No	No	No	No
Startup Lost	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
End Gain	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Storage	0	0	0	0	0	0	0	0	0	0	0	0

SIGNAL CONTROL					Phase					
					1	2	3	4	5	6
Phasing/Ordr	12	No	Lg	Greentimes	0.230	0.360	0.260	0.000	0.000	0.000
Permissives	Ys	No	Ys Ys	Yellowtimes	3.00	3.00	3.00	0.00	0.00	0.00
RT Overlaps	Ys	Ys	Ys Ys	Cycle(s)	60	60	30			
				Offset	0.91 to start of Phase 2					

NETWORK DATA

	Dist	Spd	Node	Movements				Asg	Crv	Man	X-Coord	Y-Coord
N Approach	0	0	0	0	0	0	0	Def	No	No	2125	0
E Approach	530	35	15	5	9	1	0	Def	No	No		
S Approach	0	0	0	0	0	0	0	Def	No	No		
W Approach	2130	35	13	11	3	7	0	Def	No	No		

PRESYNCHRO/TEAPAC[Ver 1.71.07] - Summary of Parameter Values

INTERSECTION # 15 Water & Pershing

MOVEMENT DATA	North			East			South			West		
	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt	Rt	Th	Lt
Demand Volumes	0	0	0	466	780	0	386	135	453	0	573	291
Peak Hr Factors	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Truck Percents	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Rt Turn on Red	0			0			0			0		
Approach Widths	0.0	0.0	0.0	12.0	36.0	0.0	12.0	48.0	0.0	0.0	24.0	12.0
Number of Lanes	0	0	0	1	3	0	1	4	0	0	2	1
Lane Group Type	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm	Norm
Saturation Flow	0	0	0	1359	3387	0	1345	4402	0	0	2486	1300
Minimum Green	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Actuated Movmts	No	No	No	No	No	No	No	No	No	No	No	No
Startup Lost	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
End Gain	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Storage	0	0	0	0	0	0	0	0	0	0	0	0

SIGNAL CONTROL					Phase					
					1	2	3	4	5	6
Phasing/Ordr	13	No	Lg	Greentimes	0.340	0.400	0.110	0.000	0.000	0.000
Permissives	Ys	Ys	Ys No	Yellowtimes	3.00	3.00	3.00	0.00	0.00	0.00
RT Overlaps	Ys	Ys	Ys Ys	Cycle(s)	60	60	30			
				Offset	0.00 to start of Phase 2					

NETWORK DATA

	Dist	Spd	Node	Movements				Asg	Crv	Man	X-Coord	Y-Coord
N Approach	0	0	0	0	0	0	0	Def	No	No	2656	0
E Approach	0	0	0	0	0	0	0	Def	No	No		
S Approach	0	0	0	0	0	0	0	Def	No	No		
W Approach	530	35	14	11	3	7	0	Def	No	No		

PRESYNCHRO/TEAPAC - SYNCHRO Formatted Input

The SYNCHRO Formatted Input report is generated when the EXPORT command is used to "build" a SYNCHRO input data file-set. The file created during an EXPORT is a file ready for use with the SYNCHRO program. The SYNCHRO Formatted Input report can be used to check the SYNCHRO data input prior to running SYNCHRO.

SYNCHRO Formatted Input. The title line of the report displays the SYNCHRO version number for which the input data has been generated.

SYNCHRO Data Input. The data files which are listed include all the pertinent data required to run the SYNCHRO model for the designated version.

The following is an example of the SYNCHRO Formatted Input text-only report using the PRESYNCHRO program sample data. The normal full-color graphics version of the report contains the same results formatted with superior layout, fonts and graphics (it is not included here to keep the size of the downloadable program/demo/update/help/pdf files to a minimum).

```
PRESYNCHRO/TEAPAC[Ver 1.71.07] - SYNCHRO Formatted Input

Exporting to C:\Teapac\PRESYNCH_LAYOUT.DAT...
Exporting to C:\Teapac\PRESYNCH_LANES.DAT...
Exporting to C:\Teapac\PRESYNCH_PHASING.DAT...
Exporting to C:\Teapac\PRESYNCH_TIMING.DAT...
```

PRESYNCHRO/TEAPAC - Time-Space Diagram for Cycle = XX sec

The Time-Space Diagram report is generated using the PLOT command. A time-space diagram can be plotted for the offsets obtained from the SYNCHRO program or from any offsets input into PRESYNCHRO. A time-space diagram is useful in visualizing the progression within a system. The terminology of Left, Right, Top and Bottom in the discussion below assumes that the time-space diagram is viewed with the distance axis running horizontally and such that the title headings are on the left-hand side of the page.

Time-Space Diagram for Cycle = XX sec. The title line of the report displays the cycle length, in seconds, for which the time-space diagram is plotted. This is the overall system cycle length.

Vertical Axis. The vertical axis of the diagram represents time, in percent of the system cycle length. The axis shows three complete cycles (100%, 200% & 300%) with each vertical increment equal to five (5) percent of the cycle. The specified cycle length can be used to convert these axes to seconds for calculating the actual travel time between intersections.

Horizontal Axis. The horizontal axis of the diagram represents distance, in feet, measured cumulatively from the first intersection at the left of the diagram. The intersection numbers are shown in the bottom row of numbers, while the row of numbers directly below the axis shows the cumulative distance from the first intersection.

Speed Slope Guide Lines. The top of the time-space diagram shows diagonal lines which approximately represent the slope of the speed profiles between intersections. These lines can be used as guides to estimate the travel profiles of vehicles traveling through the system by copying these slopes into the body of the time-space diagram, usually beginning at the start of green at each intersection. If paper or screen width is a problem, these speed slope lines may optionally be displayed within the body of the time-space diagram, but are not intended to represent the actual flow profiles when this is the case.

Time-Space Plot. The body of the diagram shows each phase of each signal's operation, both main street and side street, through the duration of the three cycles. These phases are displayed using different characters to represent each phase, as described in the Legend of Phase Symbols.

Legend of Phase Symbols. Darker characters (=, F, L, and E) are used to represent periods of the cycle when main-street flow is entirely blocked by cross-street phases. Lighter characters (blank, ', ., and :) are used to represent periods when main-street flow is permitted in varying degrees. The following describes the meaning of each of the symbols used in the plot, as shown in the Legend of Phase Symbols.

```
Symbol       Signal Phase Description
======       ================================================
blank        Main Street Through Phase
 '''         Main Street Lead or Lag from the Right (Overlap)
 ...         Main Street Lead or Lag from the Left  (Overlap)
 :::         Main Street Lead or Lag (Dual) Left-Turn Phase
```

```
===          Side Street Through Phase
FFF          Side Street Lead or Lag from the Top
LLL          Side Street Lead or Lag from the Bottom
EEE          Side Street Lead or Lag (Dual) Left-Turn Phase
```

The following is an example of the Time-Space Diagram text-only report using the PRESYNCHRO program sample data. The normal full-color graphics version of the report contains the same results formatted with superior layout, fonts and graphics (it is not included here to keep the size of the downloadable program/demo/update/help/pdf files to a minimum).

```
PRESYNCHRO/TEAPAC[Ver 1.71.07] - Time-Space Diagram for Cycle =  60 sec

            0%               100%               200%               300%
           -+---------+---------+---------+---------+---------+---------+
           !                                                             !
 13      0 +      =======''''         =======''''         =======''''    +
           !                                                             !
           !                                                             !
           !                                                             !
           !                                                             !
           +                                                             +
           !                                                             !
           !                                                             !
           !                                                             !
 14   2130 !      '''''''=====        '''''''=====        '''''''=====   !
      2500 +                                                             +
 15   2660 !         ...========         ...========         ...======== !
           !                                                             !
           -+---------+---------+---------+---------+---------+---------+
            0%               100%               200%               300%

Legend of Phase Symbols

              Thru    Lead/Lag  Lead/Lag    Dual
              Phase    (N or E)  (S or W)   Lefts
Main Street  (blanks)  ''''''''  ........  ::::::::
Side Street  ========  FFFFFFFF  LLLLLLLL  EEEEEEEE
```

PRESYNCHRO/TEAPAC - Timings for Intersection XX

The Timings for Intersection XX report, generated using the TIMINGS command, provides a summary of the current phasings and timings. This report can be used to summarize the original signal timings used for the SYNCHRO simulation or the final timings generated by a SYNCHRO optimization. The report summarizes the timings in both seconds and percent. It also provides a phase diagram and cumulative splits and offsets calculated for each phase (both green and yellow intervals).

Sequence. A two-digit code representing the phase sequencing of the traffic signal. The sequence code is actually two codes, the first digit indicates the phasing of the north-south movements while the second digit indicates the phasing of the east-west movements. For additional information, see the diagram of sequence codes used by all TEAPAC programs in Chapter 1.

Leadlags. This indicates whether turning phases lead ahead of or lag behind the through phase in multi-phase signal operation. The north-south Leadlag condition is the first value and the east-west is the second value, both separated by a slash. LD (LEAD) indicates a leading multi-phase condition, LG (LAG) indicates a lagging multi-phase condition, and NO (NONE) indicates no leading or lagging condition. If NO (NONE) appears for a multi-phase sequence, this is equivalent to a LD (LEAD) condition.

Phasing Diagram. The body of the phasing diagram shows the movements which move during each phase. Each movement is represented by a group of asterisk characters, "*", with an "arrow head" character which indicates whether the movement is straight through, turns right, or turns left.

Cycle Length. This is the cycle length, in seconds, for the individual signal. Typically there is only one cycle length for all signals in the system, the system cycle; however, a signal may be double-cycled, making its cycle length half of the overall system cycle length. In the event of a double-cycle condition, the half-cycle value is displayed.

Phase (sec/%). Phase times (the sum of the green and yellow intervals) for each phase are displayed in both seconds and percent, both with one decimal place of accuracy. These values are also displayed rounded to the nearest second and percent, for implementation on systems which require such rounding. If rounding error causes these rounded values not to add up to the cycle length or 100 percent, the cumulated error is placed in the phase with the most allocated time.

Interval (sec/%). The individual interval times for the green and clearance intervals, in seconds and percent of cycle. The clearance interval includes the yellow clearance and any all-red for a given phase.

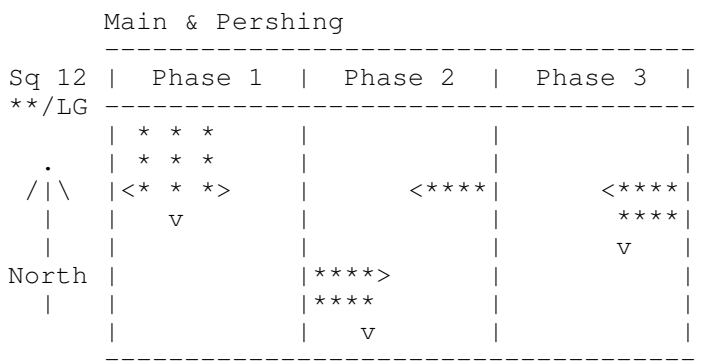
Cumulative (sec/%). The cumulative interval times, calculated starting at phase 1, for the beginning of each green and clearance interval, in seconds and percent of cycle. The clearance interval includes the yellow clearance and any all-red for a given phase.

Offset (sec/%). The cumulative splits from above, for the beginning of each green and clearance interval, but calculated with the intersection's system offset applied to all phases, both in seconds and percent of cycle.

The following is an example of the Timings for Intersection XX text-only report using the PRESYNCHRO program sample data. The normal full-color graphics version of the report contains the same results formatted with superior layout, fonts and graphics (it is not included here to keep the size of the downloadable program/demo/update/help/pdf files to a minimum).

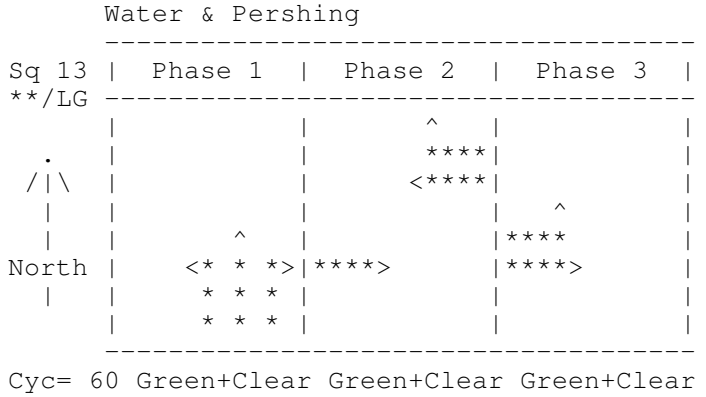
```
PRESYNCHRO/TEAPAC[Ver 1.71.07] - Timings for Intersection  13

      MacArthur & Pershing
      ------------------------------------
Sq 12 |  Phase 1  |  Phase 2  |  Phase 3  |
**/LD ------------------------------------
      | * * *     |       ^   |       ^   |
   .  | * * *     |       **** |       **** |
  /|\  |<* * *>    |      <**** |      <**** |
   |   |   v       |       **** |   ^   ++++|
   |   |       ^   |       v   |****   v   |
North |    <* * *>|           |****>      |
   |   |     * * * |           |****       |
      |     * * * |           |   v       |
      ------------------------------------
Cyc= 60 Green+Clear Green+Clear Green+Clear
Phs-sec  22.2 ( 22)  11.4 ( 11)  26.4 ( 27)
      %  37.0 ( 37)  19.0 ( 19)  44.0 ( 44)
        Green Clear Green Clear Green Clear
Int-sec  19.2   3.0   8.4   3.0  23.4   3.0
      %  32.0   5.0  14.0   5.0  39.0   5.0
Cum-sec   0.0  19.2  22.2  30.6  33.6  57.0
      %   0.0  32.0  37.0  51.0  56.0  95.0
Off-sec  16.8  36.0  39.0  47.4  50.4  13.8
      %  28.0  60.0  65.0  79.0  84.0  23.0
```

PRESYNCHRO/TEAPAC[Ver 1.71.07] - Timings for Intersection 14



	Green+Clear	Green+Clear	Green+Clear
Cyc= 60			
Phs-sec	16.8 (17)	24.6 (24)	18.6 (19)
%	28.0 (28)	41.0 (41)	31.0 (31)
	Green Clear	Green Clear	Green Clear
Int-sec	13.8 3.0	21.6 3.0	15.6 3.0
%	23.0 5.0	36.0 5.0	26.0 5.0
Cum-sec	0.0 13.8	16.8 38.4	41.4 57.0
%	0.0 23.0	28.0 64.0	69.0 95.0
Off-sec	37.8 51.6	54.6 16.2	19.2 34.8
%	63.0 86.0	91.0 27.0	32.0 58.0

PRESYNCHRO/TEAPAC[Ver 1.71.07] - Timings for Intersection 15



	Green+Clear	Green+Clear	Green+Clear
Cyc= 60			
Phs-sec	23.4 (23)	27.0 (27)	9.6 (10)
%	39.0 (39)	45.0 (45)	16.0 (16)
	Green Clear	Green Clear	Green Clear
Int-sec	20.4 3.0	24.0 3.0	6.6 3.0
%	34.0 5.0	40.0 5.0	11.0 5.0
Cum-sec	0.0 20.4	23.4 47.4	50.4 57.0
%	0.0 34.0	39.0 79.0	84.0 95.0
Off-sec	36.6 57.0	0.0 24.0	27.0 33.6
%	61.0 95.0	0.0 40.0	45.0 56.0

PRESYNCHRO/TEAPAC - SYNCHRO Imported Data

The SYNCHRO Imported Data report is generated when the IMPORT command is used to automatically input the optimized timings from a SYNCHRO UTDF file-set. The SYNCHRO Imported Data report can be used to verify the data values which were extracted from the SYNCHRO output.

Controller Settings Found. This message indicates that a valid SYNCHRO file-set was found. If no such output is found, an error message to this effect is reported instead.

T7F Greens & Yellows. This message indicates whether the green times and yellow times found in the file-set are included in or excluded from the IMPORT process. This is controlled by the type of OPTIMIZation selected.

SYNCHRO Imported Data. The actual data values which are found in the data file-set are listed in the form of the PRESYNCHRO command which is used to input these data values into PRESYNCHRO. This includes INTERSECTION, OFFSET, CYCLES, GREENTIMES and YELLOWTIMES.

The following is an example of the SYNCHRO Imported Data text-only report using the PRESYNCHRO program sample data. The normal full-color graphics version of the report contains the same results formatted with superior layout, fonts and graphics (it is not included here to keep the size of the downloadable program/demo/update/help/pdf files to a minimum).

```
PRESYNCHRO/TEAPAC[Ver 1.71.07] - SYNCHRO Imported Data

Importing from C:\Teapac\PRESYNCH_LAYOUT.DAT...
Importing from C:\Teapac\PRESYNCH_LANES.DAT...
Importing from C:\Teapac\PRESYNCH_MOVEMENTS.DAT...
Importing from C:\Teapac\PRESYNCH_LAYOUT.DAT...
Importing from C:\Teapac\PRESYNCH_LANES.DAT...
Importing from C:\Teapac\PRESYNCH_PHASING.DAT...
           and C:\Teapac\PRESYNCH_TIMING.DAT...
```

APPENDIX E

Error Messages and Trouble Spots

Appendix E Topics

This appendix contains a description of each error message which the PRESYNCHRO program is capable of issuing that is specific to the PRESYNCHRO program. Each PRESYNCHRO program error message is discussed as to the potential cause, as well as actions which might be taken to correct the errors. Note also that additional error messages can be generated by the TEAPAC package itself, or by the operating system environment. These error messages are listed separately in Appendices F and G.

In addition to the PRESYNCHRO error messages, discussion of typical problem areas and potential trouble spots is given to further assist in debugging problems with PRESYNCHRO, and to help avoid problems in the future.

Appendix E Topics

Appendix E Introduction
PRESYNCHRO Error Messages
PRESYNCHRO Trouble Spots

PRESYNCHRO Error Messages

The following messages are issued to indicate that the conditions of the program are not as expected. The PSYxx number that precedes the message in this document is the error number which is displayed at the top of the error message window. The notes that follow the message here indicate where to look for conditions that may have caused the message, and how to correct these conditions. Messages designated as **WARNINGS** may not cause computations to stop, while those designated as **ERRORS** will terminate all computations.

Errors and Warnings:

PSY01 - ERROR
PSY02 - WARNING
PSY03 - WARNING
PSY04 - ERROR

PSY05 - ERROR
PSY06 - WARNING
PSY07 - ERROR
PSY08 - ERROR
PSY09 - ERROR
PSY10 - ERROR
PSY11 - ERROR
PSY12 - ERROR
PSY13 - ERROR
PSY14 - ERROR
PSY15 - ERROR
PSY16 - WARNING
PSY17 - ERROR
PSY18 - ERROR
PSY19 - ERROR
PSY20 - ERROR
PSY98 - WARNING
PSY99 - ERROR

PSY01 - ERROR
The system cycle length has not been entered. Enter CYCLE before continuing.

This error indicates that one of the [RESULTS] commands has been executed prior to the entry of a valid system cycle length. Only IMPORT can be executed without a system cycle length entered. Action: Use the CYCLES command to enter a valid system cycle length.

PSY02 - WARNING
An INTERSECTION number must be given before this input can be made.

This warning indicates that an attempt has been made to enter data values for an [INTERSECTION] command prior to defining which intersection this data belongs to. Action: Use the INTERSECTION command to first define the intersection number data will be entered for, then re-enter the data. In the Tabular View, make sure the Execute button is used to "execute" the INTERSECTION command.

PSY03 - WARNING
An INTERSECTION number must be given before this DATA can be listed.

This warning indicates that a request has been made to display the current DATA values for an [INTERSECTION] command prior to defining which intersection this data is requested for. Action: Use the INTERSECTION command to first define the intersection number DATA is desired for, then re-enter the DATA request. In the Tabular View, make sure the Execute button is used to "execute" the INTERSECTION command.

PSY04 - ERROR
The number of nodes in the LINKLIST exceeds the maximum of the program (XXX).

This error indicates that when the LINKLIST command was processed to create the links to be simulated, the program limit of XXX simulation links was exceeded. XXX is 500 in current versions of PRESYNCHRO. Action: Break up the system into two or more smaller sub-systems, or don't use the LINKLIST to specify the links you want simulated.

PSY05 - ERROR
This INTERSECTION number is not in the NODELIST. Re-enter or add to NODELIST.

This error indicates that the INTERSECTION command was executed using a node number that was not in the NODELIST. Action: If the node number desired is already in the NODELIST, re-execute the INTERSECTION command using the proper node number. If the node number is not in the NODELIST, but should be, append it to the end of the current NODELIST so as not to disturb any of the intersection entries already made, then re-execute the desired INTERSECTION command. The Manual Mode may be needed to append the new node number to the NODELIST if more than 12 entries will result. See the special Notes section of the NODELIST command for an explanation.

PSY06 - WARNING
The SEQUENCE code for this INTERSECTION must be -1 thru -5 to use PHASEMOVS.

This warning indicates that the PHASEMOVEMENTS command was executed for an intersection whose SEQUENCES code was not in the range of -1 through -5. Action: The SEQUENCE code for the intersection must first be set to a number in the range of -1 through -5 before the PHASEMOVS command can be executed.

PSY07 - ERROR
Too many links are required for this network. Merge links or split network.

This error indicates that the internal program limit for the number of links which can be modeled has been exceeded when the internal link diagram was being constructed. This limit is 1001 links in current versions of PRESYNCHRO. Action: Break up the system into two or more smaller sub-systems, or specify fewer lane groups (non-zero WIDTHS) to describe your system. By merging lane groups, fewer links will be generated. This error only applies to PRETRANSYT.

PSY08 - ERROR
GREENS & YELLOWS must add up to demo limit of 60 seconds. Re-enter.

In a demonstration version of PRESYNCHRO, only 60 second cycle lengths can be modeled. This error indicates that this limitation has been exceeded. Action: Correct the GREENTIMES and YELLOWTIMES so that they add up to the demo limit of 60 seconds, or purchase a full-use license of PRESYNCHRO to eliminate this artificial constraint. This message will not be issued in a full-use licensed version of PRESYNCHRO.

PSY09 - ERROR
YELLOWTIMES are limited to values of only 3.0 seconds in demo. Re-enter.

In a demonstration version of PRESYNCHRO, clearance intervals can only take on values of 3.0 seconds. This error indicates that this limitation has been exceeded. Action: Correct the YELLOWTIMES so that they equal the demo limit of 3.0 seconds, or purchase a full-use license of PRESYNCHRO to eliminate this artificial constraint. This message will not be issued in a full-use licensed version of PRESYNCHRO.

PSY10 - ERROR
Zero GREENTIME for phase X of node XX not allowed. Re-enter or use 0.01 sec.

This error indicates that a phase for the intersection whose node number is indicated has a GREENTIMES value of 0.0 seconds. SYNCHRO will not allow this to be modeled. Action: Re-enter the proper, non-zero GREENTIME for the phase. If the actual phase time is 0.0 seconds, enter a value of 0.01 seconds so that SYNCHRO will not reject the input.

PSY11 - ERROR
Movement XX of node XX with non-zero WIDTH needs non-zero SATFLOW. Re-enter.

This error indicates that a movement for the intersection whose node number is indicated which has a non-zero WIDTHS entry has a SATURATIONFLOWS entry of 0 vphg. SYNCHRO will not allow this to be modeled. Action: Re-enter the proper, non-zero SATURATIONFLOWS for the lane group.

PSY12 - ERROR
Movement XX of node XX with non-zero WIDTH needs non-zero VOLUME. Re-enter.

This error indicates that a movement for the intersection whose node number is indicated which has a non-zero WIDTHS entry has a VOLUMES entry of 0 vph. This suggests that a volume has been omitted, since every non-zero lane group should have a non-zero volume in it. Action: Enter a non-zero VOLUME for the referenced movement, or remove the movement's WIDTH entry if the lane group does not exist.

PSY13 - ERROR
Movement XX of node XX with non-zero VOLUME needs non-zero WIDTH. Re-enter.

This error indicates that a movement for the intersection whose node number is indicated which has a non-zero VOLUMES entry has a WIDTHS entry of 0 feet. This suggests that a lane group has been omitted, since every non-zero volume should have a non-zero lane group in which it flows. Action: Enter a non-zero WIDTH for the referenced movement, or remove the movement's VOLUME entry if the movement does not exist.

PSY14 - ERROR
Usage Level 2 or higher is required for use of the SUBSYSTEM command.

The SUBSYSTEM command is limited to only Usage Level 2 licenses of PRESYNCHRO, or above. Action: Reduce the size of the network under study so it includes only the subset of signals desired, or license a Usage Level 2 version of PRESYNCHRO.

PSY15 - ERROR
Node XXX is not properly connected to other nodes in the NODELIST/SUBSYSTEM.

A check is made before an EXPORT or PLOT to make sure that each of the intersections in the NODELIST and/or SUBSYSTEM are reasonably connected. This does not guarantee that the system is fully or properly connected, but will catch intersections that are not connected to any other intersections in the network. Action: Review the NETWORK commands of the referenced intersection to make sure traffic flow from every signal in the NODELIST/SUBSYSTEM is properly defined, including both the source nodes and source movements. Also check intersections whose NETWORK commands include the referenced intersection.

In the case of 'diagonal' connections between intersections, special care must be taken when creating these connections, as follows. A diagonal connection is a link that connects two intersections without the typical rectangular relationship. For example, a rectangular connection might connect the east leg of one intersection to the west leg of another, while a diagonal connection might connect the east leg of one to, for example, the north leg of the other. The connection does not need to be a straight, diagonal line to be considered a diagonal connection, and often appears as a curved link -- the important consideration is that the link does not connect two intersections with the typical east-to-west or north-to-south relationship.

The best way to assure that the proper relationships are created for a diagonal link is to first create stubs for each of the intersections which approach the intersections from the typical rectangular directions, then connect these stubs with a new link, then move the dummy nodes at the ends of the original stubs (which have now become bend nodes) and/or add additional bend nodes to create the desired link appearance. If you have received this error message for a node which is connected with a diagonal (or curved) link, these requirements have probably not been met, and the easiest way to correct the situation is probably to delete any bend nodes on the link, and then re-create the connection with the instructions above.

PSY16 - WARNING
Code X error detected during IMPORT (see App. E). Check results carefully.

Several possible and typical errors which may be encountered when IMPORTing data from SYNCHRO output files are identified, as listed below.

0 File read error, usually due to a bad diskette or hard disk, no import is performed. Action: Determine and correct the cause of the bad disk.

1 MOVEMENTS.DAT header bad; import aborted. Action: Check for proper header line in data file.

2 MOVEMENTS.DAT data line bad; import aborted. Action: Check for proper data lines in data file.

3 LAYOUT.DAT header bad; import aborted. Action: Check for proper header line in UTDF data file.

4 LAYOUT.DAT data line bad; import aborted. Action: Check for proper data lines in UTDF data file.

5 Too many intersections in data files being Imported; import aborted. Action: Reduce the size of the system being Imported, so that it matches the maximum number of real nodes for your Usage Level of PRESYNCHRO (max of 500 dummy nodes as well).

6 LANES.DAT header bad; import aborted. Action: Check for proper header line in UTDF data file.

7 LANES.DAT data line bad; import aborted. Action: Check for proper data lines in UTDF data file.

8 PHASING.DAT header bad; import aborted. Action: Check for proper header line in UTDF data file.

9 PHASING.DAT data line bad; import aborted. Action: Check for proper data lines in UTDF data file.

10 One or more intersection node numbers are too large. Action: Import may continue with no immediate problems, but recognize that the imported data will likely not be re-useable by PRESYNCHRO or any other TEAPAC program due to the intersection node number(s) exceeding the TEAPAC limit of 999.

11 Data in the SYNCHRO files has been determined to be Metric units, not U.S. Customary (USC) units; import aborted. Action: Data must be in USC units to be imported. Use the Options menu in SYNCHRO and select Convert-to-Feet, then re-save the SYNCHRO files and re-Import into PRESYNCHRO.

12 An intersection in the network has been detected with more than four legs; import aborted. Action: Import into PRESYNCHRO will only operate for intersections that have a maximum of four legs. Modify the SYNCHRO network to meet this constraint by removing insignificant intersection legs and re-Import.

PSY17 - ERROR
A cycle length different than 60 sec. is not allowed in demo. IMPORT aborted.

The demonstration version of PRESYNCHRO only allows cycle lengths of 60 seconds and a different cycle length was found in the SYNCHRO output file. Action: Change the SYNCHRO run to a 60 second cycle length, or obtain a Full-Use licensed copy of PRESYNCHRO.

PSY18 - ERROR
Route definition error at node #XXX in Route X; refer to Appendix E, code X.

Several possible errors are detected in ROUTE definitions which are defined with the following codes. These errors detect the major problems which might be encountered when defining artery

routes for TRANSYT, although not all possible errors will be trapped. The user carries the final responsibility for defining routes in a manner consistent with TRANSYT's needs.

1 Node number of route list is not in NODELIST.
Action: Correct the route definition by deleting the node which is not in the NODELIST, or add that node number to the NODELIST.

2 Part of the route is 1-way while another part is 2-way.
Action: Re-define the route so that it is entirely 1-way or entirely 2-way, or break up the route into sub-sections which are consistently 1-way and 2-way.

3 Left-to-right link not found in route list.
Action: Make sure that regardless of whether the route is 1-way or 2-way, it always has traffic moving in the left-to-right direction for the entire distance of the route.

PSY19: ERROR
NODELOCATION coordinates are required by SYNCHRO for each node; please enter.

In order to make a successful run of SYNCHRO, the X,Y coordinates of each intersection must be provided. This error is produced when PRESYNCHRO detects that intersection coordinates have not been entered and all intersection coordinates still have their default values of 0,0. Action: Enter non-zero intersection coordinates for each intersection.

PSY20 - ERROR
Host program defined by Options-Setup not found. Install or adjust setup.

A check is made before the Auto option of EXPORT is performed to make sure the required host program (SYNCHRO) is present on the system. This error indicates that the designated host program cannot be located, and the Export is aborted. Action: The Options-Setup menu dialog defines the system path where the host SYNCHRO program is installed. Use this menu dialog to verify that the entry is correct. Optionally use the Browse button to either verify the path/folder named or to find and select the correct folder (select the required executable file). Press the Save button to save the new configuration. The Save button updates the contents of the PRESYNCH.CFG file for the next time PRESYNCHRO is run. If a change is made, a corresponding change will likely be required in the TEAPAC.CFG file -- if needed, make the change using any available text editor such as NotePad.

If the host program has not been installed, install it and verify the corresponding Options-Setup entry. If the program file to be executed is different than the name expected by PRESYNCHRO (such as when the version of SYNCHRO differs from the most recent supported version) the executable file name to be used can be added at the end of the path entry.

PSY98 - WARNING
Possible phasing spec error for node XXXX (timings do not sum to cycle).

After an import for a given intersection, the imported phase timings are checked to see that they add up to the imported cycle length specified for that node. This message is issued if that sum is not equal to the cycle length. Action: This condition is likely caused by an attempt to import a phasing which is not defined in SYNCHRO in a manner that is comprehensible to PRESYNCHRO, that is, normal techniques are used to define a phasing supported by PRESYNCHRO and other TEAPAC programs. The flexibility allowed by SYNCHRO in this regard is significant, and when this message is issued the user must inspect the phasing and timings imported for node XXXX carefully. In most instances, the solution is to adjust the phasing or timings in PRESYNCHRO to represent the conditions in SYNCHRO as closely as possible. In some cases, it will be apparent that some part of the SYNCHRO phasing definition is not 'normal' and a change in the SYNCHRO phasing definition to a more standard format may prevent this message from being issued.

PSY99 - ERROR
Possible diagonal legs for node X not specified in MOVEMENTS.DAT file.

If SYNCHRO contains intersection legs that approach the intersection on defined diagonals, rather than in the normal perpendicular directions, this condition needs to be defined for PRESYNCHRO via a MOVEMENTS.DAT file. When this warning is issued, PRESYNCHRO has detected a condition where data in the UTDF LAYOUT.DAT or LANES.DAT file does not appear to follow the normal perpendicular directions (according to the column headings in the LAYOUT.DAT or LANES.DAT file), but corresponding definitions for these movements have not been found in a MOVEMENTS.DAT file. Action: Create or add to a MOVEMENTS.DAT file in the same folder as your other UTDF files a definition of the diagonal movements, as illustrated in the example below. The format of the file matches that of the other UTDF files, and includes a column for each of the 12 TEAPAC movements, in clockwise order starting with the right turn on the north approach. The first line labels the file and the second line indicates the TEAPAC movement column headings. Subsequent lines indicate first the intersection number, then the LANES.DAT column headings which match up with each of the expected TEAPAC movements. MOVEMENTS.DAT is a fixed-format file, so lining up the columns is important -- 6 spaces for the INTID and 5 spaces for each column label, all columns right-justified. Use '---' as placeholders for movements which do not exist at the intersection. The three lines of the following example can be pasted from this display to create an initial MOVEMENTS.DAT file with the correct format.

```
Movement Label Data
 INTID  NRT  NTH  NLT  ERT  ETH  ELT  SRT  STH  SLT  WRT  WTH  WLT
     3  SWR  SWT  SWL  WBR  WBT  WBL  NER  NET  NEL  EBR  EBT  EBL
```

PRESYNCHRO Trouble Spots

A number of common problems occur when people are first using PRESYNCHRO, or as they begin to attempt more advanced applications. This section provides a limited discussion of these types of problems that have been identified. If other such problems occur, jot them down in this

part of the manual, then contact Strong Concepts so that they may be updated in future issues of the manual, and immediate solutions or workarounds can be developed for you. This approach will also allow for future versions of the program to account for these trouble spots to the degree possible.

Lane Group WIDTH Designation
Phasing SEQUENCE Designations
INTERSECTION Command

Lane Group WIDTH Designation

The WIDTHS command is a powerful command that designates both the width of a lane group as well as its lane usage. As such, it can be initially confusing, but ultimately provides a powerful and easy-to-use means of identifying this information in a simple and concise manner. The first thing to recognize is that if a non-zero WIDTH appears in a through lane group slot, this WIDTH can be used by any vehicles on the approach. The only limitation is that turning vehicles that have designated exclusive turn lane WIDTH will not use the through lane width. Exclusive turn lane WIDTH is designated by putting a non-zero WIDTH in a turn lane group slot.

Another way of looking at this is how VOLUMES are assigned to lane group WIDTHS. Through lane VOLUMES can only be assigned to through lane group WIDTHS. Turning VOLUMES will be assigned entirely to exclusive turn lane group WIDTHS, if they exist, otherwise they will be assigned only the adjacent through lane group WIDTH.

A common occurrence of this dilemma is on the stem of a "T" intersection, where no throughs exist, but all turns are made out of a single lane approach. In this case, the only option is to declare the single lane as a through lane from which all turns will be made. If more than one lane exists, each can be assigned to the appropriate turns as they are used.

Phasing SEQUENCE Designations

Any time a "sequence code" is required by the program, a two-digit number must be entered. The first digit represents the phasing type for the north-south movements, as defined in Figure 1-2 of Chapter 1, while the second digit represents the phasing type for the east-west movements. This is a standard convention used by all TEAPAC programs which require the specification of a signal phasing. It only requires remembering the eight distinct phasing types shown in Figure 1-2, all of which follow a logical progression of phasing treatment for left turns. By learning these eight types, a combination of 64 distinct phasings can be precisely represented with a single two-digit number. This phasing can also be communicated quickly and succinctly to other users.

Note also that the phasings specified by the sequence code can be altered slightly by the addition of permissive left turns as defined by the PERMISSIVES command, by a change in phase order as defined by the LEADLAGS command, and by the addition of overlapping right turns based on the existence of exclusive right turn lanes (OVERLAPS). Also, if a SEQUENCES code -1 through -5 is specified, the phasing can be defined arbitrarily by proper use of the PHASEMOVEMENTS command.

INTERSECTION Command

In the Tabular View, the INTERSECTION command is an active command which requires use of the Execute button to "execute" it. When selecting a new intersection number from the NODELIST to use on the INTERSECTION command so that information can be entered or reviewed for that intersection, first enter the new node number, then use the Execute button to "execute" the INTERSECTION command. The dialog box will now show the current values for the new intersection. The first time the INTERSECTION command is issued for an intersection, the description can also be entered before the Execute button is used. When subsequent entries of the INTERSECTION command are made without the description, the previously entered description is retrieved.

APPENDIX F

TEAPAC System Error Messages

Appendix F Topics

TEAPAC system messages are displayed by all TEAPAC programs whenever an identifiable fault condition is detected. The message may be due to the command itself, to one of its parameters, or as a result of the action taken by the command. When a condition is detected, an error number and message is displayed identifying the type of condition encountered. This appendix discusses the TEAPAC messages and their meanings, followed by a discussion of potential causes and actions which may correct the conditions. Table F-1 summarizes the error numbers which are discussed in this appendix. The remainder of the appendix lists and discusses each of these messages in numerical order.

The messages in this appendix are specifically TEAPAC system messages which can be detected by any TEAPAC program. These are identified by a prefix of "TPC" in the error code. Appendix E lists those errors which are unique to a specific TEAPAC program. These are identified by a different prefix, "XXX", related to the program being run. Appendix G lists those errors which are generated by the operating environment being used, and as such are unique to that operating environment. The form of these error messages is dependent upon the operating environment being used. Messages are either WARNINGS or ERRORS. A WARNING might be advisory only, while ERRORS are usually fatal and terminate the current action.

Once an error message has been displayed and acknowledged, the program will respond with either an opportunity to re-enter a parameter value, or, in the Manual Mode, the possible need to re-enter an entire new command line in order to fix the error. If a new parameter value is all that is needed to correct the problem, the program will prompt for this using the appropriate dialog.

Table F-1
Summary of TEAPAC System Error Messages

Command Entry Errors
- TPC01: ERROR - command is not recognizable
- TPC02: ERROR - abbreviation for more than one command

File Errors
- TPC11: ERROR - file name cannot be located as specified
- TPC12: ERROR - file number is not in the range of 0 to 5
- TPC13: ERROR - file number is not defined by FILES command
- TPC14: ERROR - requested file number is currently in use
- TPC15: ERROR - file access exceeds 6 levels of nesting
- TPC16: WARNING - file name does not exist, create?
- TPC17: ERROR - read/write error at line xxxxx in file x
- TPC18: WARNING - file name already exists, overwrite?
- TPC19: ERROR - failed attempt to read past end of file x
- TPC20: ERROR - path\file name exceeds size limits
- TPC21: WARNING - data written by XXXXX Vv.vv.bb may be lost, overwrite?
- TPC22: WARNING - possible inconsistent usage of advanced data file

Parameter Errors
- TPC31: WARNING - keyword is not recognizable
- TPC32: WARNING - more parameters found than were expected
- TPC33: WARNING - parameter is not a valid numeric entry
- TPC34: WARNING - integer number not in the accepted range
- TPC35: WARNING - decimal number not in the accepted range
- TPC36: WARNING - node number not in NODELIST

Command as Parameter Errors
- TPC41: WARNING - INVALID COMMAND IGNORED
- TPC42: WARNING - too many commands listed on this command
- TPC43: WARNING - AMBIGUOUS ENTRY IGNORED

Demonstration Errors
- TPC44: ERROR - AUTO Export not allowed for demo
- TPC45: ERROR - only one file can be opened at a time for demo
- TPC46: ERROR - use of printer not allowed for demo
- TPC47: ERROR - writing to disk not allowed for demo
- TPC48: ERROR - allowed input range limited for demo
- TPC49: ERROR - default values cannot be changed for demo

Table F-1 (continued)
Summary of TEAPAC System Error Messages

Command Specific Errors
- TPC51: ERROR - GOTO variable does not match current REPEAT
- TPC52: ERROR - ERROR IN PROGRAM SPECIFICATION
- TPC53: ERROR - REPEAT specification is not valid
- TPC54: ERROR - PERIODS allows only 5 distinct time period ranges
- TPC55: ERROR - PERIODS time period 2nd entry occurs before 1st
- TPC56: ERROR - PERIODS time value entered is not a valid time entry
- TPC57: ERROR - PERIODS time periods entered define too many entries
- TPC58: ERROR - PERIODS time periods entered cannot overlap
- TPC59: ERROR - COUNTS (VEHICLE or TRUCK) too many entries
- TPC60: ERROR - COUNTS (VEHICLE or TRUCK) invalid entry
- TPC61: WARNING - INTERSECTION # required before input can be made
- TPC62: WARNING - INTERSECTION # required before data can be listed
- TPC63: ERROR - INTERSECTION # not in NODELIST
- TPC64: WARNING - old UTILIZATION entries must be inverted
- TPC65: WARNING - negative SEQUENCE code needed to use PHASEMOVS
- TPC66: ERROR - CONDITIONS values cannot be entered for demo
- TPC67: ERROR - PATHASSIGNMENT list must start/end with valid node
- TPC68: WARNING - PATHDISTRIBUTION type # required before input can be made
- TPC69: WARNING - PATHDISTRIBUTION type # required before data can be listed

Miscellaneous Errors
- TPC71: ERROR - BUFFER SIZE EXCEEDED...SORT ABORTED
- TPC72: ERROR - SCRATCH FILE LIMITS EXCEEDED...SORT ABORTED
- TPC81: ERROR - higher Usage Level License is needed
- TPC91: ERROR - HELP FILE MUST HAVE STRING COUNT IN LINE 1
- TPC92: ERROR - TOO MANY CHARS REQUIRED FOR COMMAND STRINGS:

Appendix F Topics

Appendix F Introduction

TPC01 - ERROR
This command is not recognizable. Re-enter or type HELP [ALL] for full list.

This error message will be displayed if a command entry cannot be identified as a valid command. This error is generally generated by the misspelling of a command or an invalid command abbreviation in the Manual Mode. TEAPAC programs will accept a wide variety of abbreviations for any one command as long as the characters are unique to one and only one command (see TPC02 below) and the characters appear in the correct order as in the command. For example, VLMS is a valid abbreviation for the VOLUMES command while VMLS would generate a TPC01 error message. Since the command could not be identified, the program does not process any of the parameters entered and requests another entry. Action: Re-enter the

command or a valid command abbreviation along with its appropriate parameters. Use the Help-Commands menu or HELP [ALL] to see all possible commands alphabetically.

TPC02 - ERROR
This is an abbreviation for more than one command. Use more letters.

This error is generated when the program has been unable to identify one and only one command from an abbreviated command in the Manual Mode. An abbreviation could be a single character if it uniquely defines a command; however, if the character or string of characters can be interpreted as more than one command, a TPC02 error message will be displayed. Since the command could not be identified, the program does not process any of the parameters entered and returns to the command level prompt. This error only applies to the Manual Mode. Action: Re-enter the correct command or a valid command abbreviation along with its appropriate parameters. Use the Help-Commands menu or HELP [ALL] to see all possible commands alphabetically.

TPC11 - ERROR
This file name cannot be located as specified. Re-enter a different name.

This error message has been superseded by TPC16 and TPC18.

TPC12 - ERROR
File number xxxxx is not in the range of 0 to 5. All file access is aborted.

TEAPAC programs can access from one to five data files at a given time. These five files are specified by the use of the FILES command. Each file is numbered from one to five in the order they are entered with the FILES command. Commands such as LOAD and SAVE direct the program to these files by giving the <File Number> of the file to be used. This error will occur if the <File Number> parameter value used is not between 1 and 5, inclusive. Other file access commands, such as OUTPUT, use the <File Number> parameter in a similar fashion. Action: Re-specify the command which is referencing an improper <File Number> with the correct <File Number>.

TPC13 - ERROR
File number xxxxx is not defined by the FILES command. File access aborted.

TEAPAC programs can access from one to five data files at a given time. These five files are specified by the use of the FILES command. Each file is numbered from one to five in the order they are entered with the FILES command. Commands such as LOAD and SAVE direct the program to these files by giving the <File Number> of the file to be used. This error will occur if the <File Number> parameter of a command references a position of the FILES command which is not currently defined. This error typically occurs when the FILES command is not used to define a <File Number> before referencing its use in a LOAD or SAVE command. It may also occur if an incorrect <File Number> was specified. Action: First define the <File Name> for the <File Number> being referenced with the FILES command, then re-issue the file access command; or re-issue the file access command with the correct <File Number>.

TPC14 - ERROR
Requested file number xxxxx is currently in use. All file access is aborted.

Each of the five files named on the FILES command can be accessed by several commands; however, if a file is currently being access by one command (such as LOAD), that file can not be accessed by another command (such as another nested LOAD) until the current access is completed. This situation can occur when using a control file where one file's commands access another file's commands through use of nested LOADs. Action: Remove the multiple referencing to a single <File Number>; or restructure the file access so that one access is completed before the next is begun.

TPC15 - ERROR
File access (LOAD/SAVE/etc) exceeds 6 levels of nesting. All access aborted.

File access commands such as LOAD and SAVE can only be nested to a depth of six levels. If more than six levels of file access are generated, this error message will result. This situation can inadvertently develop when a file process is aborted upon execution of the next file access command. Action: Re-issue the file access command which was aborted (this error will clear all file access); or eliminate the situation which requires more than six levels of file access.

TPC16 - WARNING
This file name does not exist. Create a file by this name? .....(No/Yes)

This error message occurs when the requested <File Name> on the FILES command does not exist. Typically, this occurs when the File Switch for a new file was not used and the file cannot be located as specified (see Appendix G - File Specification). For example, if no Switch is designated and the file does not currently exist, then the warning message will be displayed to indicate that the file will need to be created if it has been specified properly. This condition normally occurs if the name of an existing file is misspelled on the FILES command or a request has been made to use a non-existent file. In either case, this message prevents a new file from inadvertently being created if this was not the intention. Action: The program is prompting the user whether the non-existent file should be created as if the /N switch had been used. By responding "Y" to this prompt, the file name used will be created and the error condition is erased. If any other character is pressed, then the file name will not be created and the user should re-specify the correctly spelled file name.

TPC17 - ERROR
Read/write error at line xxxxx in file x. ESCape to abort continued attempts.

This error indicates that the <Record Number> in the file currently being accessed is not readable. This typically occurs when the record of the file has never been defined by a SAVE command or other file creation techniques. It will also occur if an attempt is made to access data past the physical end of the file, especially if the file does not have an end of file terminator. Action: Re-specify the location within the file to be accessed; or first create information in that part of the file before trying to use it. In the case where repeated TPC17 errors occur through an attempt to LOAD non-existent information from a file (normally past the end of the defined file's contents), the ESCape key will abort the LOAD process and return to enter another command. Frequently, this error can be avoided by adding an end of file terminator to the end of the file.

TPC18 - WARNING
This file name already exists. Use it anyway? .....(No/Yes)

This error message occurs when the requested <File Name> on the FILES command already exists, but the File Switch for a new file was used (see Appendix G - File Specification). For example, if the /N Switch is designated and the file currently exists, then the warning message will be displayed to indicate that the file's contents, if any, will be overwritten if the file has been specified properly. This condition normally occurs if the name of a new file is misspelled on the FILES command or the intended new file name has already been used. In either case, this message prevents the existing file from inadvertently being overwritten if this was not the intention. Action: The program is prompting the user whether the existent file should be used anyway, as if the /N switch had not been used. By responding "Y" to this prompt, the file will be used as specified and the error condition is erased. If any other character is pressed, then the file named will not be overwritten and the user should re-specify the correctly spelled or different file name.

TPC19 - ERROR
Failed attempt to read past end of file x at line xxxxx. File access aborted.

This message indicates that an end of file marker was read in a data file during a read operation (typically LOAD). The program will abruptly halt the file access with this message at that point and return to the command input mode. Normally, this situation will not occur, since the program should return from file access via the occurrence of a RETURN command in the data file. Action: Verify that the file access location is correct and that a RETURN command exists at the end of the file's information. Then re-issue the file access command, if appropriate.

TPC20 - ERROR
Invalid path\file. Path exceeds 180 chars or name of file exceeds 70 chars.

This message indicates that an attempt was made to name or open a file whose file path or file name specification exceeded the TEAPAC limits of 180 characters for the file path or 70 characters for the file name. The file path limit includes the drive letter, and the file name limit includes the file extension and any switches used. Action: If the file path is too long, re-locate the file or sub-folder being used to a location where this limit will not be exceeded. Then re-issue the file access command, if appropriate. As an alternate, network drives can frequently be mapped to a new drive name, thereby reducing the file path length considerably by using a drive letter instead. If the file name is too long, re-name the file so that it meets the file name limit. Since SCENARIO Condition files and certain file switch options can add as many as 6 characters to file names designated by users, it is recommended that user file names not exceed a limit of 64 characters to avoid potential problems when these tools are used.

TPC21 - WARNING
Data written by XXXXX Vv.vv.bb may be lost. Overwrite?...(No/Yes)

This message indicates that a save operation has been requested for a file which contains data which was written by a different TEAPAC program, and thus is subject to possible data loss if the save operation is permitted. The authoring program of a file is determined when a file is opened and used, only if it was created by any TEAPAC program with the Version 5 or later

TEAPAC interface. This message may also be issued if an earlier version of the same TEAPAC program being used created the file and that earlier version saved information in a different manner such that data loss may occur. The authoring program's name, version and build numbers are listed in the warning message. Action: The program is prompting the user whether the existing data in the file should be overwritten anyway. By responding "Y" to this prompt, the file will be used as specified, with the possible loss of prior data values. If any other character is pressed, then the file named will not be overwritten and the user should re-specify a different file name, as appropriate, and re-specify the save operation desired.

TPC22 - WARNING
This Save appears inconsistent with prior Advanced file usage. Save anyway?

This message indicates that a save operation has been requested for a file using a normal Windows menu such as File-Save where it appears that such a save might be inconsistent with prior advanced file usage techniques applied to this same file. Primarily this is detected when the most recent file activity was to a different location in the file, or to a different file. In such a case, a normal Windows save function such as File-Save which will go to line 1 of file 1 is anticipated to be an inadvertant save which might not be desired by the user. Action: This condition is merely a warning to prevent a possible overwrite of data in an advanced use file. The program is prompting the user whether the save should be performed, or not, at the user's discretion. If the save is desired, select Yes; if not or there is any uncertainty, select No to abort the save.

TPC31 - WARNING
This keywordis not recognizable. Look at HELP for its allowed values.

This error message indicates that an invalid parameter value was detected. Generally, this indicates that an invalid character string was entered as a parameter value. Action: Re-enter the appropriate parameter value or values to correct the invalid entry; or press the ENTER key to ignore the invalid entry and leave the previous parameter value.

TPC32 - WARNING
More parameters were found than were expected. The extras have been ignored.

This message is displayed when more parameter values are entered for a particular command than the program will accept. This usually indicates a miscount of input; often a parameter value was entered twice. Most commands will re-prompt for a correct parameter list after this error. After this error, any extra entries will be ignored. The parameter list can also be re-typed starting at the position where a duplicate or unwanted entry was typed. Null (*) entries may be used to skip over to that position in the input. All other correct parameter entries for the command are accepted and processed as usual. Action: Re-enter those parameter values necessary to edit the parameter values into the desired set of values. In the Manual Mode, where this error will most likely occur, it is recommended that the DATA or ASK command be used to verify that the final accepted parameter values are those which were desired.

TPC33 - WARNING
This parameter is not a valid numeric entry. Re-enter with a proper number.

This error message indicates that alphabetic or special characters were entered for a parameter which must be a numeric value. Most commands will re-prompt for parameter re-entry after this error. After this error is received, the invalid entries will be ignored. The parameter list can also be re-typed starting at the position where the invalid entry was typed. Null (*) entries may be used to skip over to that position in the input. All other correct parameter entries for the command are accepted and processed. Action: Re-enter those parameter values necessary to edit the parameter values into the desired set of values. In the Manual Mode, it is recommended that the DATA or ASK command be used to verify that the final accepted parameter values are those which were desired.

TPC34 - WARNING
This integer number is not in the accepted range xxxxx to xxxxx. Re-enter it.
This input is not in the accepted range xxxxxxxxxx to xxxxxxxxxx. Re-enter.

When a parameter value is entered which lies outside the allowable range of values, this error message is displayed. If the input entry accepts decimal places, TPC35 is displayed. If input entries are rounded to the nearest integer value, TPC34 is displayed. The appropriate ranges of allowable values shown in the error message are usually constants; however, they may be controlled by other input parameters on other commands. Further information on input limits can be found in Chapter 4 or Appendix B of the program documentation. Most commands will re-prompt for parameter entry after this error. After the error is issued, the invalid entries will be ignored. The parameter list can also be re-typed starting at the position where invalid entry was typed. Null (*) entries may be used to skip over to that position in the input. All other correct parameter entries for the command are accepted and processed as usual. Action: Re-enter those parameter values necessary to edit the parameter values into the desired set of values. In the Manual Mode, it is recommended that the DATA or ASK command be used to verify that the final accepted parameter values are those which were desired.

TPC35 - WARNING
This decimal number is not in the accepted range xxx.xx to xxx.xx. Re-enter.

When a parameter value is entered which lies outside the allowable range of values, this error message is displayed. If the input entry accepts decimal places, TPC35 is displayed. If input entries are rounded to the nearest integer value, TPC34 is displayed. The appropriate ranges of allowable values shown in the error message are usually constants; however, they may be controlled by other input parameters on other commands. Further information on input limits can be found in Chapter 4 or Appendix B of the program documentation. Most commands will re-prompt for parameter entry after this error. After the error is issued, the invalid entries will be ignored. The parameter list can also be re-typed starting at the position where invalid entry was typed. Null (*) entries may be used to skip over to that position in the input. All other correct parameter entries for the command are accepted and processed as usual. Action: Re-enter those parameter values necessary to edit the parameter values into the desired set of values. In the Manual Mode, it is recommended that the DATA or ASK command be used to verify that the final accepted parameter values are those which were desired.

TPC36 - WARNING
Node # xx used in xxxxxxxxxxxxxxx entry is not in NODELIST.

When a node number is entered which is not included in the NODELIST, certain functions are not likely to perform properly. These include PATHDISTRIBUTION, PATHASSIGNMENT, GENRATION and ASSIGNMENT. Other entries such as NETWORK and MASTERNODE permit the entry of node numbers not included in the current NODELIST/SUBSYSTEM. Action: In the cases where the entered node number is expected to be included in the NODELIST, either add the intersection to the NODELIST, if appropriate, or change the entry so it uses an intersection number already in the NODELIST.

TPC41 - WARNING
INVALID COMMAND IGNORED

This error message indicates that an invalid command used as a parameter value was detected. This most often occurs when an unrecognizable command string is entered for either the HELP, ASK, DATA, SAVE, or RESET commands. These commands will ignore the entire command list when this occurs. Action: Re-issue the command with the correct or properly abbreviated command parameters.

TPC42 - WARNING
There are too many commands listed as parameters for this command. Re-enter.

This message is displayed when too many commands are entered as parameter values for a particular command. This only occurs when using the HELP, ASK, DATA, SAVE, or RESET commands (which use commands as parameters). Typically, this error occurs when using Group Names as parameter values. The total number of commands contained in the list cannot exceed the total number of commands in the program. When this error occurs, the program will prompt the user to re-enter the command with a shorter list. Action: Re-issue the command with the correct list of command parameters, or re-issue the command several times with partial lists to get the desired result.

TPC43 - WARNING
AMBIGUOUS ENTRY IGNORED

This error is identical to TPC41 above, where the command used as a parameter is ambiguous and the parameter is ignored. Action: Same as TPC41 above.

TPC44 - ERROR
This demonstration version does not permit use of the AUTO option of EXPORT.

For a demonstration program, the AUTO option of EXPORT is disabled. Normally, this option allows the exported file to be launched directly into the host program without the need to name the file and manually run the host program and open the exported file. Action: Purchase a full-use license for this program to enable this feature.

TPC45 - ERROR
This demonstration version permits use of only one file. Others are ignored.

For a demonstration program, the use of multiple files simultaneously is disabled. Normally, this option allows up to five data files to be open simultaneously for easy access to data in all files using the advanced file handling techniques of TEAPAC. Action: Purchase a full-use license for this program to enable this feature.

TPC46 - ERROR
This demonstration version does not permit use of printer. Request ignored.

For a demonstration program, the ability to print results is disabled. Normally, this option allows the contents of any output window to be directed to any printer accessible from your computer. Action: Purchase a full-use license for this program to enable this feature.

TPC47 - ERROR
This demonstration version does not permit use of the AUTO option of EXPORT.

For a demonstration program, writing information to a disk file is disabled. Normally, input data and results can be saved to disk files at locations accessible from your computer. Action: Purchase a full-use license for this program to enable this feature.

TPC48 - ERROR
This value is limited to the range allowed by this demonstration version.

For a demonstration program, certain input ranges are limited so arbitrary input values cannot be entered. Normally, a full range of typical input values is allowed for every input accepted by the program. Action: Purchase a full-use license for this program to enable this feature.

TPC49 - ERROR
This command's values cannot be modified in this demonstration version.

For a demonstration program, certain command entry values cannot be changed from their default values. Normally, a full range of typical input values is allowed for every input accepted by the program. Action: Purchase a full-use license for this program to enable this feature.

TPC51 - ERROR
The GOTO variable does not match the current REPEAT command. Access aborted.

If the <Destination> parameter on a GOTO command is not a <Variable> parameter of the most active REPEAT command, this message will be displayed. Command execution is terminated and a new command instruction is issued. Action: Verify that all REPEAT and GOTO variable references are correct and re-issue the LOAD command to restart the REPEAT loop process.

TPC52 - ERROR
ERROR IN PROGRAM SPECIFICATION

This error occurs when an invalid <Program Name> parameter is used with the STOP command. The <Program Name> parameter must be specified following the rules for file specification outlined in Appendix G. Action: Re-issue the STOP command using the correct file

specification; or execute the STOP command without a <Program Name> and do a system directory to determine the proper name for the desired program.

TPC53 - ERROR
The REPEAT specification is not valid. Check manual. File access aborted.

This error occurs when any of the parameter values for the REPEAT command are not acceptable. For example, it could be that the <Variable> used is already in use or not an alphabetic character, or that the range and increment variables are not valid numeric values. Action: Re-issue the REPEAT command using proper parameter values.

TPC54 - ERROR
Only X distinct time period range(s) is(are) allowed. More have been defined.

The PERIODS command allows only five distinct time periods of counts to be defined. This requires five pairs of start and stop times to be entered. If more than five time periods are entered, this error will be generated. Action: If more than five periods were actually counted, they will need to be separated into two distinct runs of TURNS or merged into fewer time periods with zeros entered for some of the count intervals which were not counted. If this is not the case, check for the proper entry of each of the start and stop times on the PERIODS command following the count interval.

TPC55 - ERROR
The second time of the period cannot occur before the first time. Re-enter.

The PERIODS command allows the entry of pairs of start and stop times to define the range of time each count period encompasses. The first number entered for each pair defines the start time, entered in 24-hour time notation. The second time of each pair defines the end time of the period, and must not be less than the first time of the period. If the second time is less than the first, this error is displayed. Action: In this case, correct the PERIODS entry so that each stop time is no earlier than its associated start time.

TPC56 - ERROR
The time that was entered is not a valid time entry. Re-enter.

If the time entry of the PERIODS command does not match the count interval entered, it is designated as an invalid time entry by this error message. For example, if 15-minute counts are to be entered, every time entry of the PERIODS command must end with 00, 15, 30 or 45. If 60-minute counts are to be entered, each time entry of PERIODS must end with 00. Action: Check the count interval used (first parameter of PERIODS) and make sure the times used on PERIODS match the constraints listed above or round entries to the nearest value that matches the above constraints.

TPC57 - ERROR
The time periods entered have created more than the max of 97 entries.

For an entire day of counts (24 hours), 96 distinct 15-minute time periods exist. If cumulative counts are performed, 97 count intervals will be needed for these counts. This is the maximum number of 15-minute intervals TURNS allows. This error is issued if it attempts to create more

than 97 count intervals, based on the time period start and stop times entered. Action: Make sure that the start and stop times entered for the time periods do not overlap, cover more than a single 24-hour period, or in any other fashion attempt to generate more than 97 distinct count intervals. Non-overlapping count periods for a single day will always fit into this limit without error, if defined properly on the PERIODS command. Attempts to combine several days' counts for a single intersection should be avoided, with this error message being a common result of such an attempt.

TPC58 - ERROR
The time periods entered cannot overlap. Re-enter without overlap.

Each of the time periods defined on the PERIODS command are not allowed to overlap in any way. If the start time is the same as or precedes any other stop time, or if a stop time is the same as or follows any other start time, this error will be displayed. Action: Check that the time periods entered do not overlap in any way. If they do, they must be entered as two separate problems to TURNS, and cannot be combined.

TPC59 - ERROR
The extra inputs for this movement entry have been ignored. Check for error.

This error is generated by either the VEHICLECOUNTS or TRUCKCOUNTS command when too many entries have been entered in the Manual Mode. If entries are being made for a given movement number, there cannot be more count entries following the movement number than there are number of count intervals defined by the PERIODS command. If entries are being made for a given time interval, no more than twelve count entries may follow the time being entered, one for each movement. Action: Check the entries made following the movement number of time, making sure the number of entries match the limits discussed above. This can be particularly tricky when entering counts for a given movement, especially when more than one time period is defined by the PERIODS command. Use the Tabular View of the Visual Mode or the ASK VEHICLECOUNTS command to see on the full-screen display what entries are expected when entering rows or columns of the count tables.

TPC60 - ERROR
xxxxx is not a valid movement number or time value entry. Re-enter properly.

The first parameter of the VEHICLECOUNTS and TRUCKCOUNTS commands must define whether the following entries are for a given movement or a given time interval. To do this, the first entry must be a valid movement number (1-12) or a valid time interval as defined by the PERIODS command. Action: If entering data for a given time interval, use the DATA or ASK command to display the valid times which have been generated by the current PERIODS command. Re-issue the VEHICLECOUNTS or TRUCKCOUNTS command with a proper movement number or time, or re-issue the PERIODS command so the proper times are defined for your count information.

TPC61 - WARNING
An INTERSECTION # must be given before this input can be made. Enter here?

This message indicates that an INTERSECTION number has not been selected prior to the entry of a data value. When an input value is entered that is intended to pertain to a specific intersection, that intersection number must first be selected with the INTERSECTION entry before the input value is entered. If this has not occurred, the program doesn't know which intersection to assign the entry value to. Action: If you know the intersection number you intend to be using, enter it in the error dialog and select Yes. In this case, the INTERSECTION command will be issued for you for that intersection. If you do not know the intersection number you wish to use, or are uncertain, select No, then use the INTERSECTION command to select an intersection from the NODELIST and re-enter the input value for that selection. In the Tabular View, make sure the Execute button is used to "execute" the INTERSECTION command.

TPC62 - WARNING
An INTERSECTION # must be given before this DATA can be listed. Enter here?

This message indicates that an INTERSECTION number has not been selected prior to the request to list a DATA value. When a data value is to be listed with DATA for a specific intersection, that intersection number must first be selected with the INTERSECTION entry before the value can be listed. If this has not occurred, the program doesn't know which intersection's data to list. Action: If you know the intersection number you intend to be using, enter it in the error dialog and select Yes. In this case, the INTERSECTION command will be issued for you for that intersection. If you do not know the intersection number you wish to use, or are uncertain, select No, then use the INTERSECTION command to select an intersection from the NODELIST and re-enter the DATA request for that selection. In the Tabular View, make sure the Execute button is used to "execute" the INTERSECTION command.

TPC63 - ERROR
This INTERSECTION number is not in the NODELIST. Add to NODELIST? ..(No/Yes)

This message is issued if an intersection number is entered that is not currently in the NODELIST. Since the purpose of INTERSECTION is to select a node number from the list in NODELIST, most often this condition indicates an invalid selection that the user will want to correct. Action: The normal response will be to select No, indicating that the intersection number entered is incorrect and must be corrected. However, there a several cases where this message can be used as a shortcut method for adding intersections to the NODELIST. In the case where it is known that the entered number is not in the NODELIST and it is desired to add it to the end of the NODELIST, select Yes and the intersection will be added to the NODELIST and selected in a single click. This can be a very effective way of building a NODELIST on the fly as new intersections or scenarios are needed, or as multiple data files are loaded into a single multi-intersection database to be saved as a single file.

TPC64 - WARNING
UTILIZATION entries > 1.0 from old data file have been inverted for HCM 2000.

This warning indicates that a UTILIZATION entry has been encountered with a value greater than 1.0, normally when a SIGNAL85 or SIGNAL94 data file has been loaded. Due to the new

technique used to define unbalanced lane utilization in the 1997 & 2000 HCMs, these values have been automatically inverted (1/x) to reflect the new definition. This message warns the user of this automatic conversion. Action: If the UTILIZATION values > 1.0 are, in fact, from an old SIGNAL85 or SIGNAL94 file, no action should be required. In any case, the user should simply make sure that this is the case and verify that the inverted results are appropriate.

TPC65 - WARNING
The SEQUENCE code for this INTERSECTION must be -1 thru -9 to use PHASEMOVS.

This warning indicates that the PHASEMOVEMENTS command was executed for an intersection whose SEQUENCES code was not in the range of -1 through -9. Action: The SEQUENCE code for the intersection must first be set to a number in the range of -1 through -9 before the PHASEMOVS command can be executed.

TPC66 - ERROR
Entry of this command is not allowed for the demonstration program.

In a demonstration version of TURNS, the intersection conditions for a warrant analysis take on preset values which cannot be changed by use of the CONDITIONS command. This error indicates an attempt has been made to use the CONDITIONS command. Action: Purchase a full-use license of TURNS to eliminate this artificial constraint. This message will not be issued in a full-use licensed version of TURNS.

TPC67 - ERROR
Path list must start/end with valid external/access node numbers. Re-enter.

When entering a PATHASSIGNMENT command for the current PATHDISTRIBUTION type of traffic, the path list must either start or end with a valid external node number, and conversely must then end or start with a valid access node. Action: For inbound distribution types, the first node of the path list must be the same as the external node number appearing on the current PATHDISTRIBUTION command, and the last node must be one of the inbound access nodes on the inbound GENERATION command. Conversely, for outbound distribution types, the first node of the path list must be one of the outbound access nodes on the outbound GENERATION command, and the last node must be the same as the external node number appearing on the current PATHDISTRIBUTION command. Check what condition is not being met and adjust as appropriate.

TPC68: WARNING
A PATHDISTRIBUTION type # must be given before this input can be made.

This message indicates that a PATHDISTRIBUTION type number has not been selected prior to the entry of a data value. When an input value is entered that is intended to pertain to a specific distribution type, that type must first be selected with the PATHDISTRIBUTION entry before the input value is entered. If this has not occurred, the program doesn't know which type to assign the entry value to. Action: If you know the distribution type you intend to be using, enter it in the error dialog and select Yes. In this case, the PATHDISTRIBUTION command will be issued for you for that type. If you do not know the type you wish to use, or are uncertain, select No, then use the PATHDISTRIBUTION command to select a type and re-enter the input value

for that selection. In the Tabular View, make sure the Execute button is used to "execute" the PATHDISTRIBUTION command.

TPC69: WARNING
A PATHDISTRIBUTION type # must be given before this DATA can be listed.

This message indicates that a PATHDISTRIBUTION type number has not been selected prior to the request to list a DATA value. When a data value is to be listed with DATA for a specific distribution type, that type must first be selected with the PATHDISTRIBUTION entry before the value can be listed. If this has not occurred, the program doesn't know which type's data to list. Action: If you know the distribution type you intend to be using, enter it in the error dialog and select Yes. In this case, the PATHDISTRIBUTION command will be issued for you for that type. If you do not know the type you wish to use, or are uncertain, select No, then use the PATHDISTRIBUTION command to select a type and re-enter the DATA request for that selection. In the Tabular View, make sure the Execute button is used to "execute" the PATHDISTRIBUTION command.

TPC71 - ERROR
BUFFER SIZE EXCEEDED...SORT ABORTED

Programs which perform substantial built-in sorting functions may encounter files whose contents require too much buffer space to be sorted. Within a TEAPAC program, it is difficult to correct this situation. Action: Attempt to reduce the amount of information being sorted; or use a system program to sort the file external to the TEAPAC program.

TPC72 - ERROR
SCRATCH FILE LIMITS EXCEEDED...SORT ABORTED

Programs which perform substantial built-in sorting functions may encounter files whose contents require too much scratch file space to be sorted. Within a TEAPAC program, it is difficult to correct this situation. Action: Attempt to reduce the amount of information you are trying to sort; or use a system program to sort the file external to the TEAPAC program.

TPC81 - ERROR
A higher Usage Level License is needed to use this command. Upgrade license.

A command or action request has been made for a function which is not supported by the Usage Level which has been licensed. For example, a design optimization function of Usage Level 2 may have been requested while using a program licensed only for Usage Level 1 which does not optimize. Also, the limits of program may have been exceeded for the Usage Level licensed, as in trying to use 25 intersections when the licensed usage level only allows 12. Action: Limit the function and/or size of the problem being analyzed to those licensed; or upgrade your licensed Usage Level to include the function and/or size needed.

TPC91 - ERROR
HELP FILE MUST HAVE STRING COUNT IN LINE 1

This error indicates there is a problem with the information in the XXXXX.CMD file which supports the running of the TEAPAC program, where XXXXX is the name of the program. This

information is not user serviceable. Action: Re-install the program from the master program disk.

TPC92 - ERROR
TOO MANY CHARS REQUIRED FOR COMMAND STRINGS

This error indicates there is a problem with the information in the XXXXX.CMD file which supports the running of the TEAPAC program, where XXXXX is the name of the program. This information is not user serviceable. Action: Re-install the program from the master program disk.

APPENDIX G

Operating System Messages and Installation Notes

Appendix G Topics

Certain aspects of program installation and execution will vary among different computer systems. This is dependent upon the operating system of the computer rather than the software installed. Run-time error codes and file specification are two of the more prominent of these aspects. In addition, control of printed output, interactive editing control and program installation are dependent on the operating system.

This appendix discusses these aspects of TEAPAC program implementation for any of the 32-bit Windows operating systems. The details discussed herein should be appropriate for any standard implementation of the these operating systems. Table G-1 summarizes the organization of this appendix.

Table G-1
Summary of Operating System Messages and Installation Notes

Run-Time Error Codes
File Specification
File Access
    Line Numbers
    File Numbers
Output Control
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Appendix G Topics

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Run-Time Error Codes

The list of standard run-time error codes for the software development system used for TEAPAC is too extensive to be produced here. The most common one is a divide-by-zero error, indicating unexpected conditions, usually where not enough information has been provided. If this or any other un-documented error is encountered and you are unable to identify and/or correct the problem, Strong Concepts may be able to assist you with the problem if enough information is available to reproduce the problem. If the problem can be reproduced, document the input conditions which existed prior to executing the command upon which the error occurs. This can be done with SUMMARISE prior to issuing the last command which generates the error, and copying this output to the printer. Transmit the printed information to Strong Concepts so that the problem can be duplicated and resolved. As a convenient alternate, send the data file to Strong Concepts via email as an attachment with an appropriate description of the problem and where to look for the anomaly in the output, if appropriate.

File Specification

There are four descriptive elements used by a TEAPAC program to define and access a disk data file. The elements are 1) the name of the disk drive and path to be used; 2) the actual disk file name; 3) the file name extension; and 4) a switch option. When these elements are combined, they constitute a file name specification which usually appears in the form of <File Name> in the documentation and help files:

<File Name> = d:\path\nnnnn.eee/s

It is important to note that a colon ":" must separate the name of the disk drive and the rest of the file specification, back-slashes "\" must be used to define a specific path on the drive or the network (the file path), a dot "." must separate the actual file name and the file name extension, and a slash "/" must separate the switch option from the other elements. The name of the disk drive-path, actual file name and file extension elements are identical to the file specification conventions of Windows. The fourth element, the switch option, is a unique element of the TEAPAC program package used to control an aspect of data file creation. Each of the four elements are discussed in detail below.

Drive-Path Designation (d:\path\)
File Name (nnnnn)
File Extension (.eee)
Switch (/s)

Drive-Path Designation (d:\path\)

The drive-path designation indicates which disk drive and/or system path should be used to find an existing <File Name> or to place a new <File Name>. Typically, drive-path designations are letters such as C: for the local hard drive, folder or sub-folder names enclosed in back-slashes, network paths starting with double back-slashes, or a combination of these designations. The length of the drive-path designation cannot exceed a maximum of 180 characters, and upper/lower case characters and spaces are allowed. If no drive-path designation is provided, the default drive-path comes from the third entry displayed in the dialog of the Options-Setup menu. This location comes from the program's CFG file on program startup, a file whose contents can be altered with the Save button of the Options-Setup dialog. The Options-Setup dialog changes dynamically as the user navigates through the File-Open and File-SaveAs dialogs

A common feature of Windows can be used to direct TEAPAC data files to another drive path. This is the Map Network Drive function. This process substitutes a network drive location for a drive designation. For example, on a typical system with an A, B and C drive, a MAPped D drive can be created pointing to a network drive elsewhere on the network. Then files on the network drive can be referenced in a TEAPAC program by simply using the D: drive. The Command Prompt SUBST command can also be used to map any folder or sub-folder to a virtual drive, not just map a drive as above. This is a particularly convenient way to get around the 180-character limit imposed by TEAPAC on the drive-path designation.

File Name (nnnnn)

This element is the actual file name of the data file and should be descriptive of the information contained within the file. The file name, including any file extension or switch (see below), cannot exceed a maximum of 70 characters. Upper/lower case characters and spaces are allowed. Since SCENARIO Condition files and certain file switch options can add as many as 6 characters to file names designated by users, it is recommended that user file names not exceed a limit of 64 characters to avoid potential problems when these tools are used. There are some special symbols which may not be used such as colons ":", dots "." and slashes "/" which are used as separators between the <File Name> elements. In order to minimize potential problems in naming files, it is recommended that only letters and digits be used in the disk file name.

File Extension (.eee)

As many as three characters may be used to describe the file extension. Typically, the file extension describes the format of a data file rather than the actual contents. In TEAPAC programs, if a file extension is not entered, the program will automatically generate ".tpc" as the default extension. The older TEAPAC file format extension of ".for" is also allowed. Use of the default extension is recommended.

Switch (/s)

When using the FILES command, the operating systems provide the capability to automatically create data files on disk. This capability also allows the unintentional creation of a file or the

accidental overwriting of an existing file without warning. In the case of overwriting an existing file, the loss of valuable data may result. In order to eliminate these potential file management problems, TEAPAC programs use two switches ("/N" and "/O") to indicate the intention of creating a new disk data file. If a data file is expected to already exist, a switch is not required.

The "/N" switch is used to automatically create a "New" data file that doesn't already exist, without any error or user query. If the "/N" option is used and a data file already exists for <File Name>, a warning message will be displayed stating that the <File Name> already exists. This protects the user from accidentally over-writing an existing file when a new file was expected. If no switch is used, the TEAPAC program will expect to find an existing data file on the designated disk drive. If there is no existing data file for <File Name>, a warning message will be displayed indicating the file can not be located. This protects the user from accidentally creating a new file when an existing file was expected to exist, probably identifying a spelling error in the file name.

If a requested file does not exist and the /N Switch is not used, the user will be prompted as to whether to allow the program to create the data file anyway. This effectively eliminates the need to use the /N Switch; the program will create a new file if prompted to do so even when /N is not used. Conversely, if a requested file exists and the /N Switch is used, the user will be prompted as to whether to allow the program to overwrite the contents of the data file anyway, even though it was thought to be a new file. In either case, a user response of "Y" eliminates the potential error condition and the program continues with the selected action. If "N" or any other response is made, the program processes the condition as an error, usually with an opportunity to re-enter the bad file specification.

The "/O" switch is used to designate an "Otherwise" or "dOn't care" condition. If a data file exists for <File Name>, the file will be used and possibly overwritten. If the data file does not exist, a new file will be created under this option. This option can also be interpreted as the "Output" option, since it is typically invoked only when the file is to be used for output, rather than input. This mode creates a file if it is needed or uses one that already exists.

File Access

All file access commands in TEAPAC programs (such as LOAD and SAVE) use line numbers and file numbers to describe where the file access is to take place. For example, the syntax of the LOAD command is: **LOAD <Line Number> <File Number>**. In order to LOAD the proper information from the data file, the proper <Line Number> and <File Number> must be specified. The <File Number> describes which of the defined FILES are to be used, while the <Line Number> describes where in the file to start the access. Each of these parameters are discussed below.

The File-Open/Save/SaveAs dialogs always work with line number 1 of file number 1; the following discussion only applies to the Advanced Files LOAD and SAVE options.

Line Numbers

Line Numbers

The line number of the file describes where in the file the access should begin. If a new file has been opened to SAVE information, the line number should be line 1 to start at the beginning of the file. When this information is to be retrieved, line 1 should be used for the LOAD command. If only one set of information is to be stored in the file, line 1 should always be used for every SAVE and LOAD performed. This is equivalent to the standard Windows functions of File-Open/Save/SaveAs.

Information may be stacked in files sequentially. For example, if the data for an analysis is SAVEd starting at line 1 of a file and takes up 50 lines of the file, another scenario can be SAVEd starting at line 51 of the file. If it also takes 50 lines, as reported by the SAVE command, this information will be stored in lines 51-100. In order to retrieve this information, line 51 should be used as the starting line number of the LOAD command. If the first scenario is desired again, simply LOAD starting at line 1 again.

Any number of scenarios or conditions may be SAVEd and LOADed to and from a file, simply by knowing at which line number the information starts. When SAVing information, it is important to either re-SAVE starting at the same line number as previously used, or to SAVE starting at the next available line number of the file. When re-SAVing information, make sure the same information is SAVEd as previously used so that it takes up the same number of lines used previously. If more lines are used, they will overwrite the beginning of the next information (if it exists), and if less lines are used they will not erase the end of the previously SAVEd information.

After any file access is completed, such as a LOAD or a SAVE, the default line number for that file remains at the "next line" of the file until another file access command is executed or another file is opened. For example, after the first SAVE above taking 50 lines of the file, the default line number for the next file access command will be line 51. If another scenario is to be SAVEd, the default line number may be used without remembering what it is. For File #1, this line number is displayed in the dialog box of the file access command. Another use of the default line number is for access of SAVEd scenarios in the same order they were SAVEd. For example, the first scenario from above can be LOADed starting at line 1 and analyzed, then the next scenario can be LOADed starting at the default line number of 51, again without remembering what it is.

Another line number that is remembered by the program is the "last line" that was used for the file by any file access command. This line number is designated by using line 0 of the file. For example, if information from the second scenario above was LOADed (starting at line 51) and the analysis determined that are error in the input existed, it could be corrected and re-SAVEd using line number 0. Since the previous file access command (LOAD) started at line 51, whether by default or actual input, the following SAVE 0 command will start at line 51 again, effectively re-SAVing the information over the previous information with the corrections. In this sense, a

repeated series of **LOAD *** and **SAVE 0** commands will LOAD the next information from the file, then re-SAVE any changes made before LOADing the next information.

File Numbers

The file numbers used in file access commands such as SAVE and LOAD refer to the position in which the file name desired exists on the current FILES command. The FILES command can carry up to five files simultaneously and the file number assigned to each is the position of the file name in the FILES list. For example, if existing conditions for an analysis are stacked sequentially in a file called EXIST and optimized conditions are to be stored in a file called OPTIM, each could be open at the same time by using the **FILES EXIST OPTIM** command. Since EXIST is the first file in the file list, it will then be referred to as file number 1 by subsequent file access commands. OPTIM is the second file name in the list, so subsequent file access commands will use file number 2 for optimized conditions.

For example, using this situation, each scenario of existing conditions would be retrieved by using the command **LOAD * 1** and each set of optimized conditions would be SAVEd by using the command **SAVE * 2**. If the optimized conditions are to be retrieved while the same FILES command is in effect, the first scenario would be retrieved by a **LOAD 1 2** command and subsequent scenarios would be retrieved by **LOAD * 2** commands.

The file number used only applies to the current FILES list in effect, and need not be the same every time the files are used. For example, if the above optimized scenarios are to be retrieved on another day and the existing conditions are of no concern, the **FILES OPTIM** command can be used to define OPTIM as file number 1, then the optimized scenarios can be retrieved with **LOAD * 1** commands. Furthermore, since file number 1 is the default file number when executed from the keyboard and the next line number is always the default line number, the entire default **LOAD * *** command can be used, making the LOADing as easy as possible.

Output Control

Within a TEAPAC program it is possible to redirect output display on the screen to other output devices. The most common use of this function is to direct output to the printer; however, it is also possible to direct output to disk files. This section discusses the methods of redirecting output to these devices.

Printer Control
Disk File Output

Printer Control

Any of the results generated by a TEAPAC program will appear in a Results window from which they can be printed. The Results window has a File menu from which the Print command can be selected. This will direct the program output in the Results window to the default printer. The Ctrl-P key may also be used as a shortcut key to print the Results window. From the main menu,

the File-Print (Ctrl-P) selection will print a copy of the last output seen in the Results window. This last output can be viewed with the View-LastOutput menu command.

The PrintSetup options of these File menus can be used to select specific printers, as well as printer options like number of copies, print to file, print both sides, etc. prior to issuing the File-Print command. The SetupAndPrint option performs both functions with a single menu selection. The default printer can be set outside of the TEAPAC program by selecting the Printers folder of My Computer, selecting the desired printer, and clicking the Set_As_Default option in the File menu.

Disk File Output

TEAPAC programs have several options for directing program output to disk files. In the Results window the File-SaveAsText menu option can be used to copy the contents of the Results window to a file named and located by the subsequent dialog entry. This file is an ASCII text file which can be opened by any text editor. Its default extension is .txt. The Edit-CopyAll menu option will copy the entire contents of the Results window to the Windows clipboard which can then be used by any other Windows program such as a text editor or word processor. The Edit-Copy menu option will copy to the clipboard only that part of the Results window which has been selected by dragging the mouse cursor over a small portion of visible text. In the event that too much output has been generated to be displayed by the Results window, as in the case of output from a control file, the SaveAsText file will contain all of the output even though it cannot all be displayed. Some printer drivers and/or Windows printing systems may also offer other alternative ways to direct printed output to a file, although this will normally not result in a strict ASCII text file like the options above.

Installing TEAPAC Programs

Installation of TEAPAC programs follow the normal Windows practice of running the Setup.exe program from the selected program folder of the distribution CD-ROM. Demos and updates downloaded from the internet install the same way using the downloaded .exe file such as S2Kw32.exe for SIGNAL2000. The installation process prompts the user for information about the installation folder, etc. and performs all the necessary configuration of the Windows environment, including icon creation and un-install options in the Control Panel. The TEAPAC Menu is automatically installed as a part of the process, and the default .CFG files are also created.

The default .CFG files (whose contents can be reviewed and changed from the Options-Setup menu) contain the default installation path name for the most recent supported version of any host program which works in conjunction with the TEAPAC program (e.g., HCS2000 for SIGNAL2000, PASSER-II for PREPASSR, TRANSYT-7F for PRETRANSYT, CORSIM for PRENETSIM, etc.). These paths should be modified, as necessary, to reflect the actual installed location of the host program. The same is true of the TEAPAC.CFG file which directs the TEAPAC Menu where to find non-TEAPAC programs. (if edited externally, TEAPAC.CFG must be edited with a text editor.) The program will look for the host program before an

EXPORT AUTO is performed, and will issue a message if it cannot be located as specified. In the event that a host program uses a name for the required executable file which is different than that expected by the TEAPAC program, the desired executable name can be added at the end of the path in the Options-Setup dialog (or the .CFG file directly).

All TEAPAC programs are designed to co-exist in the same installed folder, and work best together when installed this way. If a TEAPAC program is to be re-located to a different folder on a system, it is highly advised that it first be un-installed using the Add/Remove Programs dialog in the Control Panel, then re-installed to the desired location. Network installations must take care that all files and directories used have correct read/write privileges for the users.

APPENDIX H

Addenda

Appendix H Topics

Appendix H provides a location for recent release notes and addenda which may be published after the official release of this documentation. This appendix can also be used to store printed copies of new release notes for updated versions of the software, as produced by the Help-RecentChanges menu or the MESSAGES command, for off-line reference.

Appendix H Topics

Appendix H Introduction

Version Notes:

- Ver 1.81
- Ver 1.80
- Ver 1.71
- Ver 1.70
- Ver 1.61
- Ver 1.60
- Ver 1.02
- Ver 1.00

:PRESYNCHRO Ver 1.81 27MAY08

Build 11 - 27MAY08

>Support added for offset-only optimization.

Users can now select the Offsets option of the Edit-System-Optimization dialog so that any optimization in SYNCHRO will hold the green times at the values they had prior to the SYNCHRO optimization. This allows the green times (splits) to be optimized by other methods, such as SIGNAL2000's critical-movement-based HCM optimization, and limit SYNCHRO's optimization to offsets-only.

>Default file type for Import is .CSV to match SYNCHRO Ver 7.

The default file type for the Import dialog has been changed to .CSV so it is consistent with the most recent version of SYNCHRO, Ver 7. This is also the default file type of the file selection dialog which pops up when the Browse button is used.

>Temporary solution devised for SYNCHRO Ver 7 1-file CSV Export problem.

A problem has been discovered in the SYNCHRO Ver 7 1-file CSV format which is preventing accurate exporting of signal timings from PRESYNCHRO to SYNCHRO using this format. While this problem is researched by TrafficWare, a temporary workaround has been devised which circumvents the problem. After the 1-file Export to SYNCHRO is accomplished and with no intersections selected, the user should use the Transfer-DataAccess-Version6 menu in SYNCHRO to Read the _PHASING.CSV data file which is created as a part of the process which creates the 1-file CSV file for SYNCHRO Ver 7. This file has a prefix name which matches the name of the 1-file CSV file -- for example, by default Export Auto creates a file called TMPSYN.CSV and the additional file to read is called TMPSYN_PHASING.CSV. Reading this file will correct the timings which were incorrectly received by SYNCHRO from the 1-file Export for Ver 7.

>Import Browse button shows all possible SYNCHRO file types.

The file selection dialog which pops up when the Browse button is used for Import now defines all of the various file types associated with all versions of SYNCHRO, using descriptions of the file types which describe which version of SYNCHRO each extension belongs to.

>Better initialization for Import to avoid crash for null Import.

Certain variables are now initialized before an Import so that if the process encounters no importable conditions the program will not crash.

>Only include RT phase module when overlap actually exists, not just allowed.

A right turn overlap phase module had the potential of being included in an Export when such a condition was allowed by the inputs but didn't actually exist. Now a right turn overlap phase module is only included when a right turn overlap actually exists.

>Include CBD condition in Export & Import for SYNCHRO Ver 7.

CBD conditions are now included in both Exports and Imports when SYNCHRO Ver 7 (which includes these parameters) is involved.

>Dialogs identify need for consistency between Yellowtimes & ReqClearances.

The dialogs for GreenTimes and YellowTimes have been updated with additional text to clarify the importance of maintaining a consistency between the YellowTimes and ReqClearances entries. This consistency is especially important when the entry format is Converted from By-Phase to By-Movement and when Exporting to ring-based software.

>Correct offsets displayed in time-space diagram for exclusive pedestrian phase.

When an intersection included an exclusive pedestrian phase, as defined by the PedTime entry, it was possible that the offsets and/or phases displayed in the time-space diagram of a Plot would not be correct. This possibility has been eliminated.

>No attempt to Export, Plot or Timings if no real nodes have been selected.

Any attempt by the program to perform an Export, Plot or Timings directive will now be aborted in the event that no real nodes have been selected for the desired action, thus avoiding a potential crash due to lack of adequate data to perform the selected action.

>Error message for improperly connected node has detailed help text.

Error #15 which is issued when a node is detected that is not properly connected to the rest of the network now includes a reference to the Help text for the message which gives details about potential causes and resolutions. In particular, diagonal connections between nodes which have not been created properly are described in detail.

>Include manual distance status for dummy nodes in View-Summary (SUMMARISE).

The status of a link's Network distance entry is now displayed properly for dummy nodes, eliminating the garbage that could potentially be displayed in its place in the View-Summary or Summarise output report.

>Plot & Timings only check for valid data of intersections to be plotted/listed.

The Plot and Timings actions will now only check that data entries appear valid for nodes to be plotted or timings listed, rather than all nodes in the defined network. This allows portions of a large network to be plotted or timings listed before data for the entire network has been entered.

>Widen timing field in TIMINGS report to allow intervals over 99.9 seconds long.

The display fields for the TIMINGS output report have been increased so that timing intervals with values larger than 99.9 seconds can be displayed properly.

>Generic changes made to all Ver 7.81 TEAPAC programs.

Allow negative percentage on ASSIGNMENT for Passbys and Diverted trips.

Use Shift while dragging mouse to define development area on network display.
Dialogs identify need for consistency between Yellowtimes & ReqClearances.
Display dummy node dot and node number if it is current node or in Subsystem.
Note in CrdSysMgmt dialog that NewLinkDist button assumes coords are in feet.
Able to save from OpenIntoEdit if it was first file opened into program.
NOTE shows 'Issue X Not Selected' when case selection does not select an Issue.
File-OpenMerge does not allow existing Network data to be overwritten by zeros.
File-SaveAs to an existing file name with Scenario conditions doesn't hang.
File-SaveAs shows file type of current file & better file type descriptions.

Build 00 - 08OCT07

>Synchro Ver 7 1-File CSV Format Is Supported for Export and Import.

When Synchro Ver 7 is involved, the UTDF file format used for both Export and Import from/to PRESYNCHRO is now the new 1-file CSV UTDF format. This is a vastly easier format to work with at the user level, providing the ability to automatically launch Synchro with this file already open for Export, and the need to create only a single file when saving a UTDF file from Synchro to be Imported by PRESYNCHRO.

When using Synchro Ver 7, use the Transfer-DataAccess-OpenCombinedDataFile and Transfer-DataAccess-SaveCombinedDataFile menus to read or write 1-file CSV UTDF files from/for PRESYNCHRO. When using the AUTO options of Export and Import in PRESYNCHRO, the single file name TMPSYN.CSV will be used. When Exporting, the file will be opened automatically.

:PRESYNCHRO Ver 1.80 25APR07

Build 00 - 08JUN07

>Synchro Ver 7 CSV Format Is Supported Automatically for Export and Import.

The most recent version of Synchro installed on the user system is now determined automatically by PRESYNCHRO from the name of the executable in the installed folder, and the UTDF 2.1 file format used for both Export and Import from/to PRESYNCHRO is adjusted accordingly. For the last two versions of Synchro, Ver 6 and Ver 7, the CSV format of UTDF 2.1 is used, while for Ver 5 the original DAT format of UTDF is still used (as with previous versions of PRESYNCHRO).

When using Synchro Ver 7, use the Transfer-DataAccess-Version6 menu to read or write UTDF files from/for PRESYNCHRO. The correct file names will be automatically entered into the UTDF dialogs, so they simply need to be read one after the other in order (first Layout, then Lanes, then Phasing and then Timing). The new 1-file CSV format offered by Synchro Ver 7

will be coming in a later release of PRESYNCHRO, permitting the automatic launching of the complete data file from a PRESYNCHRO Export.

>Intersection and Street Name Labels Are Exported and Imported for Ver 6 & 7.

The CSV format now used by PRESYNCHRO for Export to and Import from Synchro Versions 6 and 7 permits the inclusion of street names and intersection descriptions, so these descriptions are now included for all Exports and Imports from/to PRESYNCHRO when these versions of Synchro are involved. When Exporting from PRESYNCHRO, use the normal TEAPAC orientation convention when describing the intersection via the Intersection dialog (put the north-south street name first and the east-west street name last, separated by an ampersand '&') and these descriptions will be properly transferred to Synchro (no intersection or street names are exported when this convention is not followed). When Importing a complete network from Synchro, the TEAPAC convention will observed when combining the street names used in Synchro. Commas must be omitted from any intersection or street name description.

>Long File Names and Longer Path Names Implemented, Plus New File Format.

All aspects of TEAPAC data file storage, including SCENARIO condition files, have been extended so that file names can have as many as 70 characters in their names, and file path names can have as many as 180 characters, both including upper or lower case characters and spaces. Since SCENARIO condition files and certain file switch options can add as many as 6 characters to file names, it is best if user-entered names are no more than 64 characters.

A new, higher capacity data file format with a new file extension (.tpc) has been introduced which will be used by default for all new files created by all TEAPAC programs. This format is text-based like the old .for format so it is still easy to see what is in a file, as well as write such files from other programs, but with a look to the future this format has line length maximums of 256 characters per line (254 useable) instead of the more limiting maximums of the .for format which had maximums of 128 characters per line (80 useable). The old format can still be read and written simply by continuing to use the .for extension, but users are encouraged to convert files to the new format simply by saving .for file with the new .tpc extension (then archive the .for files so they are not used by mistake). The long file names and paths mentioned above are valid for either extension.

>New User Discussion Forum Is Accessible Directly from the Help Menu.

The new User Discussion Forum which has been implemented for TEAPAC users and is available 24/7 for posting questions and searching through answers to previous questions can now be accessed directly from the Help menu of the program. The Forum can also be accessed directly using any internet browser at www.StrongConcepts.com/Forum.

:PRESYNCHRO Ver 1.71 08SEP06

Build 07 - 25JAN07

Scroll down to 'Ver 1.70 07NOV05, Build 07 - 11NOV05' below for the major changes which were implemented for the original Visual TEAPAC release.

>SCENARIO Program Makes its Debut.

SCENARIO is a new Visual TEAPAC program that can create multi-scenario data files either from scratch or from data files of earlier versions of TEAPAC. Users can 1) select from pre-defined typical scenario structures like multiple volume conditions or multiple timing plans, 2) create completely unique scenario conditions for their analyses, or 3) customize a pre-defined scenario structure to meet their specific needs. The primary advantage of using SCENARIO is that all the scenario data is saved without dangers of duplicated data which often occur when scenarios are managed by the typical use of File-SaveAs.

The SCENARIO program also functions as an automatic plugin for all other Visual TEAPAC programs so that each program automatically understands the SCENARIO file structure which has been created, and at no additional cost (see below).

SCENARIO can easily define both single-issue and multi-issue conditions, and any data dialog can be assigned or re-assigned to any defined issue for as many as five independent, mutually-exclusive Issues. 25 Conditions can be defined for each Issue. For example, a very common and simple single-issue scenario would be having multiple volume conditions for one or more intersections for which capacity analysis, intersection design and/or signal timing optimization would be needed. Other examples of a single-issue analysis could be multiple years of traffic count data for TURNS or WARRANTS, or multiple years or zones of land use for SITE's projected traffic estimation.

Multi-issue scenarios could be combinations of any of these, where the variation of one variable is independent of the others. Another example of a multi-issue scenario could be where one Issue is changing volumes based on the time-of-day and/or day-of-week while the other Issue is independently changing intersection geometrics which depend on differing funding possibilities.

>SCENARIO Support in All Visual TEAPAC Programs.

All Visual TEAPAC programs have been updated so that support for multi-issue data files created by SCENARIO is automatic and seamless. The SCENARIO program serves as a plugin to the other Visual TEAPAC programs so that they automatically support the SCENARIO-structured files for both File-Open and File-Save. A new File menu option labeled Get-Scenario-Case allows the user to select any of the Conditions for all of the Issues which have been created, and any subsequent changes to data which are made are automatically saved in the correct Condition files which have been defined. SCENARIO has also been added to all LinkTo menus

so that SCENARIO is immediately available to modify the defined scenario structure, as necessitated by changing project assumptions.

>Generic Enhancements Made to All Visual TEAPAC Programs.

A number of additional generic enhancements and fixes have been made to the original Ver 7.00 releases of Visual TEAPAC and are collectively included as Ver 7.01 Build 07. These are documented below. Ver 7.01 Build 07 changes are free updates for Ver 7.00 licenses.

Data entry dialogs that don't apply to dummy nodes have been modified so that if they are inadvertently displayed while pointing to a dummy node they will not display unpredictable values or cause the program to crash.

The LinkTo menu has been adjusted so that if no data file path has been defined it will attempt to use the program's file path, but will not crash if neither of these is defined. The file menu options for Open, SaveAs and IntoEdit have been adjusted similarly for the condition when no data path has been defined.

A bug has been fixed that could cause a crash when clicking within an output being displayed at a zoomed-out scale on some low-resolution monitors.

:PRESYNCHRO Ver 1.70 07NOV05

Build 28 - 28AUG06

Scroll down to 'Ver 1.70 07NOV05, Build 07 - 11NOV05' below for the major changes which were implemented for the original Visual TEAPAC release.

>V7.00.28: Generic Enhancements Made to All Visual TEAPAC Programs.

A number of generic enhancements and fixes have been made to the original Ver 7.00 releases of Visual TEAPAC and are collectively included as Ver 7.00 Build 28. These are documented below and use heading lines that begin with V7.00.28:. In addition, minor program-specific changes have been made, as summarized here and detailed in the program's own specific list of updates and changes. Ver 7.00 Build 28 changes are free updates for Ver 7.00 licenses.

>V7.00.28: Number of Access Drives Increased From 5 to 10 for SITE Computations.

The permitted number of driveways which provide access to a development area for SITE computations has been increased from 5 to 10 in all TEAPAC programs, allowing greater flexibility in modeling all driveways which may exist or be proposed for a development. Along with this change comes a quicker way of entering driveway locations by combining the intersection leg direction (N/E/S/W) with the node number of the drive, such as 1N or 132E.

>V7.00.28: Input Limit for VOLFACTORS Adjusted for Consistency with Save.

The largest VOLFACTOR which can be saved in a TEAPAC data file has always been 9.99, but it's been recently noticed that the input dialog error checking permitted factors as large as 20.0 without an error, resulting in subsequent problems if an attempt was made to save such an entry. The input error checking has been modified to match the save limitation to resolve this problem. At the same time, the discussion in the documentation has been modified to reflect the same precision of save accuracy to avoid any further confusion.

>V7.00.28: Multiple Copies of a Program Can Be Open Simultaneously Again.

The source of a problem which has recently prevented multiple copies of any given program from being open at the same time, such as when comparing alternatives side-by-side. This problem has been resolved and the ability to have multiple copies open simultaneously has been re-enabled.

>V7.00.28: Minor Fixes to Drag-and-Drop Network Interface.

An occasional problem connecting T-intersections properly when bend nodes were present in the network has been resolved. Build 21 versions of the programs would notify the user of the problem immediately upon creation of a link under these circumstances. If an earlier version was used to create the network, the problem is easily detected (if it exists) with the Analyze function in the new Coordinate System section of the Setup button dialog in the main window. the problem would manifest itself with upstream connections to the wrong node and/or incorrect distances. Creation of most T-intersections were not affected by this problem.

If an old TEAPAC data file saved from a program prior to Visual TEAPAC was opened using a LinkTo, drag-to or from a command line, a crash could result when an attempt was made by the program to update the Nodelist format to the new save format. This problem has been resolved.

Build 21 - 27JUL06

Scroll down to 'Ver 1.70 07NOV05, Build 07 - 11NOV05' below for the major changes which were implemented for the original Visual TEAPAC release.

>Imported Offsets Are Rounded to Maintain Consistent Units.

Imported offsets which lie in the range between 0.0 and 1.0 are rounded to the nearest whole second so that their implicit units remain as seconds instead of changing to seconds/second.

>Check for Problematic Offset Entries When Producing Time-Space Diagram.

Problematic offset entries that might crash a time-space diagram plot are detected before they cause a crash.

>V7.00.21: Generic Enhancements Made to All Visual TEAPAC Programs.

A number of generic enhancements and fixes have been made to the original Ver 7.00 releases of Visual TEAPAC and are collectively included as Ver 7.00 Build 21. These are documented below and use heading lines that begin with V7.00.21:. In addition, minor program-specific changes have been made, as summarized here and detailed in the program's own specific list of updates and changes. Ver 7.00 Build 21 changes are free updates for Ver 7.00 licenses.

>V7.00.21: New Coordinate System Management Features.

A new set of options to help manage the network coordinate system for any given data file has been added to all programs that use the Visual TEAPAC drag-and-drop network editing and display (all TEAPAC programs except NOSTOP, TED and TUTOR). The options appear in a new dialog which is displayed when the Coord Sys button is pressed in the network Setup dialog.

The Coordinate System Management dialog offers three main function - 1) to Analyze the current network for possible coding errors such as improperly-connected nodes and scaling issues, 2) to create a New Coordinate System by shifting and/or scaling the current coordinate system, and 3) to compute New Link Distances based on the current coordinate system. For the Analyze function, a percentage error can be input to define the threshold which identifies potential scaling problems between the coordinate system scale and each link's entered distance, and an option can be selected to check the approach angle of each intersection leg.

One of the motivations for this new option is to be able to identify and adjust network coordinate systems from older TEAPAC programs which exercised the option to specify the units of the coordinate system in something other than feet. Although this is still possible, it can be problematic with the new drag-and-drop Visual TEAPAC interface, and is not recommended. In combination with the new Manual Distance option described below and the functions of this new dialog, old coordinate systems can be easily converted for more predictable use under the new Visual TEAPAC methods.

>V7.00.21: New Manual Distance Option Added to NETWORK Dialog Entry.

A new option can be selected in the NETWORK dialog individually for any given link of the network that indicates that the distance entered for that link is intentionally inconsistent with the network coordinate system and apparent network scale. Links which have this option selected are specifically excluded from the computation of the average coordinate system scale used and reported in the network Analysis function described above. Although not recommended, selecting this option allows a link's distance to be inconsistent with the coordinate system without adversely affecting the management and checking of the rest of the network.

In addition to this option, the NETWORK dialog also shows the calculated link distance based on the coordinate system (and the average coordinate system scale, if not equal to 1.0), and if this calculated distance is outside of the allowed error specified in the Coordinate System

Management dialog, it is displayed in red. The Manual Distance option status is also shown in all data summaries which include NETWORK data, and new distances which are required due to any network editing are now always based on the coordinate distance, unless a link is previously marked for Manual Distance.

>V7.00.21: Automatic Network Relationship Checks Made.

The new Analyze function of the Coordinate System Management dialog mentioned above is invoked automatically any time a data file is Opened or Saved, or any time NETWORK or NODELOCATION information is changed (either via drag-and-drop actions or direct keyboard entry), thereby giving immediate feedback when a network definition problem could be corrupting an analysis. The Analyze function is also invoked prior to other program functions which make significant use of the spatial arrangement of the network, such as Exporting in PRENETSIM, PRESYNCHRO and PRETSPPD and FindPaths in SITE.

>V7.00.21: Frequency of Automatic Update Check Can Be Set By User.

A new user entry can now be made which controls the number of days between automatic checks for program updates. The entry can be found in the Help-Check_For_Newer_Updates menu dialog. With this new feature, the maximum frequency of automatic checks is once per day, not every time the program is run. Automatic checks can be disabled by entering a frequency of 0 days, but this is not recommended (checking for updates every 10-30 days is recommended).

>V7.00.21: Improved Initial Zoom-All View for Large Coordinate Range.

The initial Zoom-All display for a network when a file is opened has been improved for all networks, especially those with a wide range of coordinates, such that the zoom level used is more appropriate for all combinations of networks and display resolutions.

>V7.00.21: Improved Network Editing Features.

A number of enhancements have been made to network editing functions to improve the response to various user actions, as follows. If a new link connection will over-write an existing leg of a node, the user is warned and given the option to select another leg or abort. If a new link creation is aborted for any reason, any new dummy nodes created as part of that process are deleted (including clicking on the network without dragging, now deleting the single node which was previously created). If a third leg is added to a bend node as part of a new link creation, the bend node is converted to a real node (and re-numbered accordingly). If deleting a node removes one leg of a bend node, the bend is converted to an external node. Default source movements for a new link which connects existing nodes with a diagonal are determined more reliably. Left-click can be used while in the Create New Link mode to select the current node.

>V7.00.21: Fixes to SIMULATION Dialog.

The 'Use TRANSYT or PASSER Actuated Model' option of the SIMULATION dialog is now both properly selectable without any error messages, and displayed properly in the dialog, and a random glitch which garbled part of the main window Network display when the SIMULATION dialog opened has been fixed.

>V7.00.21: Make Help File Useable When a Data File is Double-clicked.

A problem locating the .HLP file when a user data file was double-clicked in Windows Explorer to open it has been fixed.

Build 14 - 20APR06

Scroll down to 'Ver 1.70 07NOV05, Build 07 - 11NOV05' below for the major changes which were implemented for the original Visual TEAPAC release.

>Fix Default PLOT Function When Dummy Nodes are Present.

A problem with the PLOT function using the default list of nodes has been fixed. This only occurred when dummy nodes existed in the network.

>V7.00.14: Generic Enhancements Made to All Visual TEAPAC Programs.

A number of generic enhancements and fixes have been made to the original Ver 7.00 release of Visual TEAPAC and are collectively included as Ver 7.00 Build 14. These are documented below and use heading lines that begin with V7.00.14:. Ver 7.00 Build 14 changes are free updates for Ver 7.00 licenses.

>V7.00.14: Color Selection Added to Options Menu.

The Options menu now provides a Colors option for selecting colors which are used when generating formatted output reports and the main window network display. Any selections made are retained and used during future program sessions. Most of the default colors for formatted output reports are taken from the user's desktop color scheme (DisplayProperties-Appearance), so changing the color scheme will automatically change the output colors used when the defaults are selected. All colors selected, including actual selections and defaults, are displayed in the Color management dialog produced by the Options-colors menu selection.

>V7.00.14: Browse Button Added to Select a Bitmap File.

A browse button has been added to the Network Display and Edit Management dialog which is displayed when the Setup button of the main window is pressed. This can be used to select a bitmap background file in the data file folder as an alternative to simply typing the file name in the entry field.

>V7.00.14: INTERSECTION Dialog Options Added.

The INTERSECTION dialog which is used to select the 'current' node has been significantly enhanced with several new features, as follows. A check box enables the inclusion of dummy nodes in the drop-down list so dummy nodes can be selected from the dialog; and nodes in the drop-down list can be ordered in any of three arrangements - the order they appear in the NODELIST, numeric order by node number, or alphabetic order by intersection description.

On a related note, the network display is now updated any time a new current intersection is selected, including when it is entered from the Manual Mode, when it is entered from file input, etc. Also, when a dummy node is selected as the current node, it is always highlighted in the network display, even when the zoom level is such that other dummy nodes are not displayed.

>V7.00.14: Option Added to Delete All References to Deleted Node.

When a node is deleted or cut from the network, either from the main window network display or from the NODELIST dialog, a prompt to verify the deletion is now always issued, and the prompt now includes a new option to include the deletion of all other references to the deleted node elsewhere in the network. The option to delete all references is pre-selected by default on each deletion, but can be de-selected in the prompt dialog box.

On a related note, the manipulation of nodes in the NODELIST dialog has been extended to include dummy nodes as well as real nodes, offering greater flexibility in managing the entire node list from this dialog. A problem with the Copy and Paste functions (to and from the clipboard) has also been fixed.

>V7.00.14: Improved Support for PDF Creation.

Difficulties producing PDF files for formatted output reports with certain PDF writers have been resolved.

>V7.00.14: Improved Constraint In Use of SUBSYSTEM Function.

The use of the drag function in the main window network display to create or edit a SUBSYSTEM has been constrained for better consistency with the allowed use of the SUBSYSTEM feature based on the program's licensed Usage Level. This prevents inadvertent setting of the SUBSYSTEM which then causes an error when opening a file which has this feature saved.

>V7.00.14: Maximum Link Length Increased from 9999 to 32000.

The maximum link length allowed by all TEAPAC programs has been increased from 9,999 feet (<2 miles) to 32,000 feet (> 6 miles), and a warning message is now issued if a link is created in the main window network display that exceeds this limit.

>V7.00.14: File-OpenMerge Function Enhanced.

The File-OpenMerge function has been enhanced in several ways, as follows. First, if a file being merged contains information about a bitmap file and its scaling, this information is ignored in deference to the bitmap/scaling information currently in effect in the program. The help strings for this function have also been updated, and the function is initialized more completely each time it is used to avoid overlap with responses to previous error situations.

>V7.00.14: Help File Formatting Restored to Previous Style.

The numbering of the indented paragraphs in the Notes section of Appendix B of the Help file has been restored, as appeared previously.

>V7.00.14: Minor Cleanups and Fixes Implemented.

A number of (mostly internal) cleanups and fixes have been implemented for more reliable operation of Visual TEAPAC programs. Most of these will not be noticeable to users, but a couple will resolve certain problems a few users have experienced. For example, opening an old TEAPAC data file which does not contain valid NODELOCATION entries for each intersection will not crash, and moving a bend node under certain conditions will not cause the program to close prematurely.

Build 07 - 11NOV05

>Visual TEAPAC - A Whole New Way of Seeing TEAPAC.

All 13 modules of the TEAPAC suite of programs have been upgraded to the Visual TEAPAC (Version 7) interface. Primarily, this means each program sports a much more visual input and output system to make entering and viewing data for the analysis network much easier and to make the resulting output reports clearer and easier to read. The general aspects of the two major enhancement areas, visual input and visual output, are described below, followed by the many other supporting enhancements that go along with the Visual TEAPAC upgrade.

When combined with the unparalleled 1-file, 1-click, 500-intersection, completely seamless data sharing introduced with each of the 13 TEAPAC2004 (Version 6) programs, Visual TEAPAC provides an unmatched experience of fully-integrated visual traffic engineering and traffic planning software. Read on for the details.

>Visual TEAPAC - Graphical Input and Display of Analysis Network.

All TEAPAC programs (except NOSTOP and TUTOR) now provide a drag-and-drop user interface as a way to create and/or display the study network in the main window of the program. The network can be drawn schematically or to precise scale with the aid of an underlying grid, or

a bitmap can be displayed under the network to make drawing easy and/or display of the network more meaningful. The bitmap file can be an aerial photograph, a street map, as-built drawings, or any other such display which would be helpful, and this bitmap is exported to third-party program such as CORSIM and TRANSYT as permitted.

Streets can be drawn by clicking on the grid or scaled bitmap and dragging across the extent of the street section, creating analysis intersections where the new street segment crosses existing street segments. The Setup button can be used to identify the bitmap, scale the bitmap and establish an axis origin, either before the network is drawn or afterwards for pre-existing data files. Special display adjustment modes allow quick re-orientation to new bitmaps, such as when using higher-resolution bitmaps for a zoomed-in study area versus a regional area bitmap.

Dummy nodes are automatically created to orient external legs of intersections around the periphery of the study network, and internal dummy bend nodes are easily created for better network representation between analysis intersections. Proper treatment of all dummy nodes (externals and bends) are fully integrated into all of the TEAPAC application programs, as well as the eleven+ third-party programs to which TEAPAC analyses can be exported. Dummy nodes do not count against the maximum number of intersections allowed by each Usage Level.

Intersections and dummy nodes are easily moved within the network by simply dragging them across the grid or bitmap, with the option to freeze the associated link distances, or have them adjust automatically as they are moved.

The network view is easily adjusted with buttons for panning in eight directions, zoom in, zoom out, zoom all to show the entire network, and a rubber-band selection to outline the desired zoom-in area. The display of either the bitmap or the network is easily toggled on or off, as required, and the current intersection for subsequent dialog data entry or analysis is made by simply clicking the intersection. Intersections can also be selected by a right-click which opens a popup menu with all the data entry and data analysis dialogs immediately available, either in Normal View or Tabular View (use F3 to toggle the view). The popup menu also allows the renumbering or deletion of the selected node. Dragging a rubber-band selection box around a set of intersections can be used to define or add to (with Ctrl key) a subsystem of intersections for subsequent analysis.

The on-screen shortest-path FindPath assignment function of the SITE program is now performed in color directly on the main-window graphics network display, including the bitmap background, providing helpful visual cues while performing the assignment process.

The on-screen Startup Help? button provides immediate assistance for all of the functions described above. Visit www.StrongConcepts.com for examples of the new graphical input front-end now found in Visual TEAPAC.

>Visual TEAPAC - Enhanced Graphical Output Reporting.

All TEAPAC programs now feature enhanced, graphical output reporting for all results produced. Output reports now make full use of color and graphics drawing for arrows, phasing diagrams, permitted movements, time-space diagrams, intersection diagrams, cycle optimization graphs, daily count variation graphs, etc. All reports are printable on any color or black & white printer supported by Windows, including PDF writers. Any graphics output page can be copied to the clipboard as a bitmap so it can be pasted into other applications. The prior version's text-only results are still viewable alone or in parallel with the graphical results, and selected text can be copied to the clipboard or saved to a text file for subsequent use, as before. In Visual TEAPAC, you are no longer limited to the old, archaic, hard-to-read character graphics which was used when TEAPAC was originally created (what did your computer look like 30 years ago?).

All output reports use shades of color from the desktop theme/style setting to highlight the results, including report titles, report sub-sections, column headings and alternating output lines. The proportionally-spaced, sans-serif Tahoma font is used for easier readability, including right-justified numeric results in columns.

Viewing options include zoom in, zoom out, zoom all to see an entire page, rubber-band selection to zoom in, drag the page to scroll and click to re-center. Text strings can be searched for within one or many pages of results and multi-page results can be quickly scanned with controls to advance to the next or previous page, the next or previous report, or the beginning or end of all results.

Visit www.StrongConcepts.com for examples of the new graphical output back-end now found in Visual TEAPAC.

>Other Generic Enhancements Found in All Visual TEAPAC Programs.

Many other generic enhancements have been made to the Visual TEAPAC user interface which is now included in every TEAPAC program. These include:

-- Windows XP style buttons, drop-down lists, scroll windows, etc.
-- all Edit and Results menus can be accessed by right-click.
-- all demos allow at least 4 intersections to be entered and analyzed.
-- license keys are valid for any older version of the same program;
license info displays in Help-About, including site license address.
-- leading W removed from all program file names for easy recognition;
LinkTo and Menu looks for new name first, then old name with W, for
backward compatibility with older versions of other TEAPAC programs.
-- default node to renumber is the current node, not 0.
-- Startup Help button is located in main window and now in Help menu;
StartUp.txt can be modified by user with virtually unlimited size.
-- View-Network and Options-Graphics menu options have been removed.

>Program-Specific Enhancements Included in Visual TEAPAC Upgrade.

The new Permissives options for SIGNAL2000 are displayed and exported properly to all host programs. Dummy nodes are ignored for any PLOT or TIMINGS result, and bend nodes or unsignalized locations are ignored for any time-space PLOT. Node number entries for PLOT and TIMINGS are allowed up to the more recent upper bound of 999 instead of the older limit of 327. Various input error checks are skipped for dummy nodes, and dummy node conditions are reported in abbreviated form at the end of a Summary of Parameter Values produced for all intersections.

When dummy external nodes are created for the SYNCHRO network, a comprehensive check for prior use of the new node number is made before being used, and the default external link length for created buffer nodes is now 500 feet instead of 1,320 feet.

PRESYNCHRO output reports which are significantly enhanced by the new color-graphics results produced by Visual TEAPAC include: all phasing displays, clearly showing permitted movements, either in HCM 'by-phase' style or ring-based 'by-movement' style; and the full-color time-space diagram which shows all phases and clearance intervals, directional offsets and band widths.

:PRESYNCHRO Ver 1.61 23MAY05

Build 12 - 30SEP05

>Field Width Error Detection Modified for More Useful Performance.

A new error check was recently introduced to warn a user that too many characters for an input field had been entered and that the entry would be truncated. The aggressive response to this condition (ignoring the entry entirely) has been toned back, now accepting the truncated input with a similar warning. This reduces the potential for the need to re-type an entry which may be perfectly fine in its truncated form, or require only minor editing to correct instead of complete re-entry. The new error check has also been eliminated for any entries of the GROUPTYPES dialog, most of whose possible entry values can typically exceed the actual allocated input field width.

Another effect of the overly-aggressive error check was that certain drop-down list values in a number of dialog boxes had pre-programmed entries which exceeded the input field width, thus preventing them from executing properly. These included drop-down lists in the OUTPUT, CONDITIONS, GENERATION and PATHDISTRIBUTION dialogs. The field widths of all of these entries have been modified to accept the full drop-down list pre-programmed entries.

>Extra Warning Message Eliminated When Opening New Files.

If a user is warned about unsaved data or results values when a new file is about to be opened, with an option to first save the values, certain circumstances could cause the same message to be

re-displayed a second time, regardless of the user response to the first message. This duplicate warning message has been eliminated.

>Debug Value Removed from Display for Text Search Function.

A spurious debug value was inadvertently left in the production version of the program, displaying each time a text string is searched for in any output window or edit window. The debug display has been removed.

>Key Files Are Now Valid for All Prior Versions of Program.

The key file processing logic has been enhanced to allow a given key file to be used not only for various builds and minor updates for the licensed version, but also for any version of the program prior to the licensed version. This minimizes the hassle of multiple key file management when multiple versions of a program are being used, for example, to maintain consistency in results throughout the course of a project which was begun with an older version of a given program that has been updated.

Build 11 - 22AUG05

>Bug In Synchro Requires Reading LANES File Twice for Correct RTOR Values.

A bug has been identified in Synchro which requires that the LANES UTDF data file be read again after all other UTDF files have been read in order to make sure that the RTOR values are properly transferred into Synchro. A bug fix for this problem is pending for Synchro 6.

>Optimized Timings Can be Imported When Entry Style is Defined 'By-Movement'.

Optimized timings can now be Imported when the timing entry style is 'By-Movement'. Previously, this was not possible.

Build 10 - 04AUG05

>Right Turn Overlaps Handled by Import and Export.

Right turn overlaps which were previously not covered by Import and Export are now handled completely by both functions.

>Unused Volume File Deleted During Export AUTO.

If a TMPSYN_Volume.dat file exists prior to when Export AUTO is used, this file is deleted as part of the Export AUTO process so its data is not inadvertantly mixed with the data currently being Exported. This situation can easily arise if data from one run of SYNCHRO is saved upon

exit, in which case the TMPSYN_Volume.dat file might have been created. The automatic deletion of this file prevents any such potential error.

>Print Problem Resolved from Tabular View.

Difficulties experienced by some users attempting to print results when using the Tabular View have been resolved.

>Improved Phasing Display in Dialog Boxes.

The currently-selected signal phasing for an intersection which is displayed in some dialog boxes has been improved so that improperly-coded permitted left turns display differently than expected to indicate the error in coding.

Build 00 - 23MAY05

>Enhancements Made to Time-Space Diagram.

The default scale for PLOTting a time-space diagram has been changed from 100 feet/line to 0, the new default of 0 being a code that instructs PRESYNCHRO to determine a scale automatically which will include the entire time-space diagram on a single page.

>New Message Warns User That Calculated and/or Imported Values Have Not Been Saved.

A new message has been created which warns a user when calculated and/or imported values will be lost when the program is closed or File-New is used. This provides a check against inadvertently losing data results which could otherwise be saved in a file for future use or use by another program. The existence of unsaved calculated and/or imported values is indicated in the window caption with an asterisk (*) in the same fashion as changed user entry values. In the case of PRESYNCHRO, the protected values are any imported CYCLES, GREENTIMES, YELLOWTIMES and/or OFFSETS. A similar message is now issued when File-Open or Reset [Parameters] is used when edited, calculated and/or imported values have not been saved.

>Edit Window Contents Can Be Printed, Including Line Numbers.

The contents of the TED Edit window, either within TED or the built-in edit window in any TEAPAC program, can now be printed using the normal print menu or toolbar buttons, including line numbers.

>Global Entry of Additional Sequence Codes Now Includes All Extra Codes.

The entry of additional sequence codes for intersection 0 (to be assigned to all intersections) has been expanded so that all extra sequence codes will be assigned to all intersections, not just the

first extra sequence code. This allows added flexibility when using this global entry feature for SEQUENCES.

>VOLADDITIONALS Values Now Allowed to be Negative.

The entry or computed values for VOLADDITIONALS is now allowed to have negative values, with a complete input range permitted from -9999 to 9999. This is primarily to afford the possibility of re-assignments of traffic to result in a net reduction of volume for individual movements, either by manual entry or computations from SITE. In the case of SITE, this also means that ROUNDing of results can create small negative VOLADDITIONALS in locations that receive little or no new traffic and where final volumes are rounded down (this is appropriate and to be expected).

>LinkTo followed by Another LinkTo Performs Properly.

Multiple LinkTo operations can now be performed smoothly under all conditions without limitation. Previously it was observed that under certain conditions, one LinkTo followed by another LinkTo could cause certain problems successfully connecting to the next desired program.

>Better Graphics for Phasing Display and Bitmap Buttons.

The arrows used to represent phasing in various dialogs have been improved in quality and appearance, and if timings for phasings are defined by-movement instead of by-phase, the by-movement phasing diagrams are now shown in every relevant dialog. In addition, the pan and zoom button bitmaps within the View-Network display have been improved for better clarity.

>Option to Select Pages to Print; Page 0 for Current Page.

An option has been added to the Print-Setup dialog which allows the selection of specific pages to be printed instead of always printing all pages in the output window. Selection of page 0 will print only the current output page (the page which contains the insertion point cursor).

>View-Network Works Without Defined Network Distances.

Previously it was not possible to perform the View-Network function unless all NETWORK distances had been entered. This was due to the function's attempt to establish a scale factor between the network distances entered and the potentially arbitrary coordinate system used. Now, if distances are not entered, View-Network simply assumes the scale factor is 1.

>Warnings Issued If Too Many Characters Entered or Number Too Large in an Input Field.

If a user enters more characters in a dialog's input field than the dialog expects or can process, a warning is now issued and the entire entry is ignored, rather than just ignoring the extra

characters. This allows for better understanding by the user that the entry may not have been processed correctly. The F5 Refresh button should be used in all cases to see the current dialog values after the warning. On a similar note, if an entry has a numeric value too large for the intended internal variable, this condition is also noted with a message rather than allowing the possibility of a more catastrophic reaction by the program at a later point.

:PRESYNCHRO Ver 1.60 08SEP04

Build 06 - 22SEP04

>Summary of TEAPAC2004 Release of PRESYNCHRO.

After 2 years in development, the TEAPAC2004 version of PRESYNCHRO has been released as Ver 1.60. The highlights of the changes since its prior release include the following:

Completely seamless, one-click, one-file exchange of all input and results with SIGNAL2000, all other PRE-processors, SITE, TURNS and WARRANTS, including calculations of HCM satflows, optimized timings, peak-period turn counts and estimated site traffic.

Automated graphical dialog for easier import of diagonal legs from Synchro/SimTraffic.

New volume adjustment inputs to allow factoring volumes and adding additional volumes on a movement-by-movement basis.

New sensitivity controls for global testing of factored volumes, additive volumes, factored satflows, minimums, clearances, etc.

Complete implementation of the enhanced TEAPAC2004 (Ver 6) user interface, as described below.

>Automated Graphical Dialog for Easier Diagonal Leg Import.

The creation of a MOVEMENTS.DAT file to support the importing of diagonal intersection legs from Synchro is now augmented by a graphical dialog which illustrates the diagonal legs that must be assigned and a suggested assignment to the four legs of TEAPAC nomeclature. For most situations, this now only requires a confirming click by the user and the entry in MOVEMETNS.DAT is automatic.

>New Volume Adjustment Inputs Provide Sensitivity Analysis Flexibility.

A new input called VOLFACTORS has been added that allows a volume adjustment factor to be provided for each individual movement of each intersection. Each volume entry is multiplied by this factor, with the option of further providing a number of years the factor should first be

compounded. This feature provides the ability to easily test various traffic growth factor scenarios, as well as sensitivity analysis for the base volume entry.

Another new input called VOLADDITIONALS has been added that allows a volume adjustment value to be provided for each individual movement of each intersection. Each volume entry is adjusted by adding this additional volume, with the option of further providing a single factor for each intersection which is first multiplied by the additional volume before the it is added to the base volume. This feature provides the ability to test additive growth scenarios, in addition to the factored growth scenarios allowed by VOLFACTORS above, such as when evaluating site traffic development scenarios. The VOLADDITIONALS factor can also be used to easily 'turn off' the additional volume by using a factor of zero, and 'turn back on' the additional volumes. VOLADDITIONALS are computed directly by SITE for site traffic impact scenarios and saved in data files for immediate analysis and optimization by other TEAPAC programs.

>Browse Button Added to Import Dialog.

A Browse button has been added to the Import dialog to permit easier identification of the SYNCHRO results file which is to be used for Import, especially when the default AUTO option is not selected. This button opens a normal file-select dialog, and when a file is selected it is placed in the Import dialog entry field without the need for the user to type the actual file name.

>T2004v6: TEAPAC2004 Interface Enhancements Found In All Programs.

TEAPAC2004 (Ver 6) includes a multitude of enhancements which are part of the generic user interface found in all TEAPAC programs (some do not apply to NOSTOP, TED or TUTOR, for readily-apparent reasons). All of the generic enhancements are listed below with heading lines that begin with T2004v6:.

>T2004v6: One Common Data File Supports All TEAPAC Programs.

The most significant and obvious change made to each TEAPAC program in Version 6 is that all programs now share a single, common data file structure that contains all of the data entries used by all TEAPAC programs. This means that any TEAPAC program (except NOSTOP and TUTOR) can open any file from any other TEAPAC program, make changes to any of the data values it contains, and re-Save the file with complete retention of all data values for future use by any other TEAPAC program.

The first implication of this major fundamental change is that the concept of File-OpenShare of earlier TEAPAC programs is no longer needed since the sharing of TEAPAC files among TEAPAC programs is now fundamental and automatic. File-OpenShare has been re-named to File-OpenMerge/Share to better reflect its current function, to merge the content of multiple files, and can still be used to read and merge the content of files from older versions of SIGNAL97, SIGNAL2000 (Ver 1), SITE, TURNS and WARRANTS -- OpenMerge is automatic when reading these files. Also, the warning message when saving to a file created by one of these

other programs has been removed, again because this function is now standard procedure and has no risk of loss of data.

The second implication of this change is that any values computed by one program and to be used by another (such as peak-period volumes from TURNS, HCM satflows from SIGNAL2000, optimized signal timings and phasings from SIGNAL2000, projected traffic from SITE, etc.) need only be saved into the data file with File-Save, then the next program launched with the same file using the LinkTo menu. A single click positions the user in the next program ready to do the analysis of that program.

Lastly, all programs (except NOSTOP and TUTOR) now have the ability to store all of this data for up to 500 intersections in a single file.

>T2004v6: LinkTo Menu In All TEAPAC Programs Includes All TEAPAC Programs.

All TEAPAC programs (except NOSTOP and TUTOR) now contain the LinkTo menu which now provides immediate access to all other TEAPAC programs with a single click which causes the current data file to be re-opened in that program.

>T2004v6: LinkTo Function Now Allows Direct Link to Host Programs.

A new function of the LinkTo menu has been added which allows direct linkage to the six host programs which are supported by the six TEAPAC preprocessors. These are PRETRANSYT for TRANSYT, PREPASSR for PASSER, PRENETSIM for CORSIM, PRESYNCHRO for Synchro/SimTraffic, PRETSPPD for TS-PP/Draft, and now PRENOSTOP for NOSTOP. Since all programs have access to the control directives for all the preprocessors, this means, for example, that a TRANSYT run can be made directly from SIGNAL2000 with a LinkTo-TRANSYT (assuming a licensed copy of PRETRANSYT is installed on the system).

>T2004v6: Global Input Option for Most Intersection Inputs.

A powerful new feature has been added to all TEAPAC programs that allows the value of a single data entry to be made to all intersections in the NODELIST (or the SUBSYSTEM, if one is defined). This is done when Intersection 0 is selected, and the user is first warned of the pending global entry action and followed by an audible beep when the global entry is made. The warning message can be omitted for future such actions, if desired.

Examples of uses for this new feature include the following: Enter a common cycle length or cycle range for SIGNAL2000 optimization of all signals; designate a full SIGNAL2000 phasing optimization for all signals; set the new volume adjustment factor or number of years for compounding a growth factor for all intersections for sensitivity analysis; enable or disable the new additional volumes entry for all intersections; designate a common peak hour factor for specific movements or all movements of all intersections; set the minimum or required clearance values for optimization at all signals; set the satflow adjustment factor for all signals to perform sensitivity analysis; etc. The possibilities of this new feature are virtually endless.

>T2004v6: View-Network Function Improved with Easier Pan & New Zoom.

The View-Network function has been added to all programs (except NOSTOP and TUTOR), and has been greatly improved in functionality regarding the ability to pan up/down and left/right, as well as new functions for zoom in/out and selecting a view area of the network connections and underlying bitmap with the mouse.

>T2004v6: Output/Edit Window Major Enhancements.

The Output and Edit Windows have been enhanced with menus and toolbar buttons which provide the ability to Find a user-entered text string, find the next output report and find the next page of results. A button also allows moving backwards thru the output to the previous output page. In the Edit Window, an additional Find & Replace function has also been provided. Also, the current line number of the cursor is displayed in the status line of the window, and the ^A function now performs the standard 'SelectAll' function instead of copying the entire window to the clipboard.

>T2004v6: Toolbar Button Provided for Intersection Selection.

A toolbar button has been provided in the main window next to the +/- buttons which provides direct access to the Intersection dialog to select the 'current' intersection, allowing quick access to this common function without the need to use the menus.

>T2004v6: Intersection/Type Description Listed in Dialog Caption.

If an intersection description has been provided for the current intersection (via the Intersection dialog), this description is displayed in the caption of any intersection data dialog in addition to the intersection number. For traffic impact studies with SITE, the same function is true for the current distribution type. These number and description displays are now also included in the caption of the Tabular View window.

>T2004v6: Check For Internet Update Function Provided.

A new function has been provided in the Help menu of every TEAPAC program that allows the user to have the program check the internet for any available downloadable updates. This function can be set to automatically check for updates every time the program is launched. If updates are found, this fact is displayed along with the status of the update (free or if a fee is involved and what that fee is), as well as a link to a complete description of what functionality changes the update includes, the ability to launch an email requesting a new key for a paid update or a quote for an upgrade. Options to view a complete price list online, to launch an email requesting technical support, and to go to the Strong Concepts main web page are also provided. This feature was partially implemented in the most recent downloads of several TEAPAC programs and accepted with great enthusiasm.

>T2004v6: INTERSECTION Dialog Includes Option to Renumber a Node and All Refs.

The INTERSECTION dialog now contains a feature to renumber any intersection in the NODELIST to any value not currently in the NODELIST. When selected, all references to the old node number anywhere else in the network are also updated, making renumbering a snap.

>T2004v6: Save Remembers Selected Intersection/Type for Subsequent Open.

When data files are saved, a directive is placed at the end of the file which remembers the 'current' intersection and current distribution type so that these positions can be reset when the file is subsequently re-opened by either the same program or any other TEAPAC program.

>T2004v6: Error Message Help Leaves Dialogs Open so Errant Entries Can Be Seen.

When Help for an error or warning message is displayed, the dialog entry which caused the error or warning is now left open so the entered values can be inspected in relation to the help advise given. Also, a note is provided in the message to use the Refresh button to see the dialog with the actual current values which are likely to not reflect the entry attempted (which caused the error or warning).

>T2004v6: Errors Contain Cancel Button to Abort File-Open or Control File.

When errors or warnings are issued as a result of reading a data file, a Cancel button is now provided which allows the user to abort continued attempts to read the file. This is now a convenient way to halt attempted processing of a file which is clearly not what was intended, or for power users, a way to kill a control file which has gone off the deep end.

>T2004v6: OUTPUT Dialog Contains Entries for All Programs.

The OUTPUT dialog is a common dialog name which has had different content for most TEAPAC programs. This conflict and impediment for combining all the TEAPAC data into a single file for TEAPAC2004 has been resolved by having a common OUTPUT dialog for all programs which contains the OUTPUT parameters for all TEAPAC programs. In the manual mode and control files, this involves the addition of a new parameter #1 which is the name of the program for which the following values apply, and thus all OUTPUT parameters for all programs are stored in the file and displayed in the dialog.

>T2004v6: Wording on Dialogs Used by Multiple Programs Improved.

The wording on dialogs which are used by multiple programs in TEAPAC2004 have been clarified so that it is more apparent what the relevance is to the current program in which the dialog is found.

>T2004v6: NODELIST Entry Protected from Change in Tabular View.

The only safe place to change the NODELIST after it has been entered is in the Normal View NODELIST dialog, so the NODELIST entry in the Tabular View has been greyed and protected from change to avoid unintended changes and possible disastrous results.

>T2004v6: Options-Setup Uses Browse for Folder, not Browse for File.

The Browse button in the Options-Setup dialog now produces a Browse-for-Folder dialog instead of the File-Open dialog so it is more clear what the function will return.

>T2004v6: Dialog Actions Re. ROUTEs with 9+ Nodes Fixed, Including Save.

Certain problems with ROUTES which contained more than 8 nodes have been fixed, including saving these route definitions.

>T2004v6: Recent File Menu Option Works Under All Windows Platforms.

Display of recently used files in the File menu has presented problems under certain Windows platforms, and thus an option has been provided to turn this display off so recent files are accessed only thru the File-RecentFiles dialog. This problem has been fixed so recent files can be displayed in the File menu on any Windows platform, and thus the default condition for this feature has been changed from No to Yes.

>T2004v6: Command-Line Control File Enhancements.

When a user has set a TEAPAC program to start in the Tabular View, ASK commands in command-line control files could not be used. This limitation has been eliminated so this feature can be used, if desired.

The output window for output generated by a command-line control file now appears in front of the main window so it is immediately visible without the need to click it to bring it to the front.

A new /x option has been added at the end of a command-line file name which instructs the program to open the command-line file as File #x (the default is File #1, as before). This allows the data file which a control file #2-5 opens to be designated as File #1 so that it is the file which will be open for subsequent File-Save operations from the File menu. Opening command-line control files as #2-5 instead of #1 is now the recommended practice.

>T2004v6: -X Entry for INTERSECTION Number Allowed As Positional Input.

The intersection number on an INTERSECTION command line or dialog is now allowed to be a negative number between -1 and -N where N is the number of intersections in the NODELIST. When this is the case, the intersection selected is the i-th node of the NODELIST when -i is used.

The expected use of this feature is to allow REPEAT loops in control files to easily sequence through all the nodes of the NODELIST when the NODELIST is not in numerical order and/or not a sequential list of nodes from 1 to N.

>T2004v6: TEAPAC Menu Enhancements.

A new File menu in the TEAPAC Menu shows recent files which have been used by the program; a new Options menu allows program folder setup for all of the third-party programs supported by the Menu; a new Help menu can list recently installed changes and check the internet for updates; default support for VISSIM 4 and TRANSYT-7F Release 10 is provided.

TEAPAC files which are double-clicked to be launched thru the TEAPAC Menu now open into the menu only without launching the program that created the file (since any file can now be used by any program, this old action is no longer appropriate).

>T2004v6: Printable On-screen Manuals Available as PDF Downloads.

The full documentation for each TEAPAC program has always been directly available as the on-screen manual which also serves as the context-sensitive Help document. Options for obtaining printed/bound copies of this document have also been available at an additional cost. Now, in addition, this document is available as a downloadable PDF file which provides the ability to print a copy locally, as well as search the entire document for user-defined strings.

:PRESYNCHRO Ver 1.02 22NOV03

Build 16 - 16JUL04

>Fix for >100 Nodes in NODELIST and SUBSYSTEM Dialogs of 500 Node Version.

A problem has been fixed which could cause difficulties displaying a node list with more than 100 nodes in the NODELIST and SUBSYSTEM dialogs of the 500-node version of the program.

>Automatic Check for Updates Added When Connected to Internet.

A new feature has been added which allows an automatic check for updates via the internet any time the program is started when an internet connection is present. The automatic check can be disabled from the Help menu using the CheckForUpdates option. The same menu selectiion can be used to manually check for updates, to review details about any available updates, to download updates, to see update prices (if they are not free), to request a quote for updates and to order certain updates.

>Accelerator Key Definitions Added to Tooltip Help for Dialog Buttons.

Tooltip help strings for certain dialog box buttons have been updated to include the accelerator keys which can be used in lieu of the buttons.

Build 14 - 29MAR04

>Installation Setup Modified for Proper Creation of Shortcuts.

A change has been made to the configuration of the new MSI installation setup now used by most TEAPAC programs. Now when shortcuts are created in the start menu or the desktop during installation, they are configured properly with the installation folder set as the 'Start In' folder (Working Directory) for the shortcut. In recent TEAPAC releases which use the new MSI installation system, this configuration option was not selected, resulting in a possible problem when running the program in locating the Help file (on-screen manual, Help-Contents menu, Help buttons and F1 key) and/or the Recent Changes file (Help-RecentChanges menu).

Build 12 - 03MAR04

>Improved Lost Time Import and Export.

SYNCHRO uses an outdated lost time input method that is not consistent with the current Highway Capacity Manual. This has previously caused some difficulty in converting imported lost times from SYNCHRO into the HCM-based STARTUPLOST and ENDGAIN entries used in TEAPAC. This conflict has been substantially remedied with a new import method used by PRESYNCHRO that properly sets the TEAPAC inputs only after the timings have been input (so the phase YELLOWTIME is known, as needed by the HCM method). Imported lost times may also now include fractional seconds with the use of a decimal point in the import field.

Conversely, each movement's lost time is now calculated using the prescribed HCM methodology, and this lost time is now exported to SYNCHRO. These two adjustments should go a long way to making the lost time considerations between TEAPAC and SYNCHRO more consistent.

>Sum of Phase Times Checked Against Cycle Length.

Timings are exported to SYNCHRO in tenths of seconds, and these times (which may be rounded from their SIGNAL2000-optimized values) are now checked and adjusted to make sure they add up to exactly the cycle length to avoid an errant determination by SYNCHRO that the cycle lengths are different between intersections when they are not intended to be.

>Better Export of Phasing and Timings for T and 1-way Ints.

A more consistent Export of both the phasing and timing data for special conditions such as T-intersections and 1-way streets has been implemented. Primarily this has to do with approaches which contain left turns without an adjacent thru movement, or shared left/thru movements

which are 'unopposed' according to HCM terminology. This provides a more reliable export of such conditions from TEAPAC to SYNCHRO.

>Check for Coordinate Entry for Export.

SYNCHRO will not display networks correctly and will make certain inappropriate determinations if intersection coordinates are not provided for a SYNCHRO analysis. As such, PRESYNCHRO now checks to make sure coordinates have been provided (for multi-intersection analyses) and alerts the user when this is not the case.

>Better Default System Cycle Length Used.

The 'system cycle length' for a SYNCHRO analysis is determined by the cycle information provided for the intersection which is designated as the MASTERNODE intersection. In the event that the MASTERNODE is not defined, or if it points to an intersection not in the current SUBSYSTEM, the program now uses the first intersection of the SUBSYSTEM rather than the first intersection of the NODELIST to define the default 'system cycle length'.

>Better Scale Factor Determined Between User Coordinates and Ground Coordinates.

TEAPAC programs allow the use of an arbitrary, scaled coordinate system to be used when entering NODELOCATION values. When this is the case and ground coordinates are needed, the program deduces an appropriate scale factor between the user coordinates and ground coordinates based on link lengths provided, while recognizing the possibility of certain tolerable errors in locating each node and the impact of curved links on this process. An improved method to eliminate outliers from this scale determination has been implemented for higher probability of a better result in cases which include NODELOCATION input errors.

>Further Enhancements to Ver 5.12 Interface.

The Ver 5.12 TEAPAC interface found in most TEAPAC programs has been further refined with additional features to aid in the analysis process. These include: 1) saving the current intersection in the data file so that when the file is re-opened, the same current intersection is re-established (rather than always being pointed to the last intersection in the Nodelist), 2) providing the ability to scale a bitmap background for a single intersection analysis by right-clicking on a point 100 feet from the intersection, 3) providing a Clear button on the Subsytem and Route dialogs so that the lists displayed can be removed with a single click, and 4) the TEAPAC Menu System now runs SYNCHRO Ver 6 be default.

Build 10 - 31DEC03

>Direct Support for Version 6 of Synchro/SimTraffic.

PRESYNCHRO now supports Version 6 of Synchro/SimTraffic directly, creating and launching the native file name extensions for Version 6 by default if Synchro6.exe is present in the 'Path of Synchro program files' defined by the Options-Setup dialog. If Synchro6.exe is not found, PRESYNCHRO will look for Synchro5.exe in the same location, and if found, launch Version 5 instead without user intervention.

If the PRESYNCHRO user has both Ver 6 and Ver 5 installed on their system, the desired Version for exporting can be defined by placing the name of the executable file (e.g., Synchro5.exe or Synchro6.exe) at the end of the Synchro path definition of the Options-Setup dialog.

>Timings Input as Decimal Percentages (sec/sec) are Exported Correctly.

Timings which are entered as decimal percentages (sec/sec) are now exported correctly to Synchro/SimTraffic. Previously such entries were not exported correctly and generated obviously wrong visual results in the Synchro/SimTraffic displays.

>External 1-Way Link Exported to SimTraffic Properly.

If a network in PRESYNCHRO contained a 1-way link which exited the network, SimTraffic did not like the way this condition was exported despite the fact that it was accepted and modelled properly by Synchro. The method used now to export this condition has been changed so that it is accepted and modelled correctly by both Synchro and SimTraffic (Ver 5 & 6) without modification by the user.

>Pending New PRENOSTOP Program Added to LinkTo Menu.

A pending new TEAPAC program call PRENOSTOP which interfaces the NOSTOP program to the data of other TEAPAC programs such as this program and SIGNAL2000 has been added to the LinkTo menu.

>Further Enhancements to Ver 5.1x Interface.

If a NODELIST entry is read from a Shared file, the new NODELIST is appended to the current NODELIST instead of replacing it. This effectively allows the merging of separate data files to create a larger system. Caution must be used when one file is already open in a program and another file is opened that was not created by the current program, since this file will automatically be Open-Shared, and thus appended if it has a different NODELIST.

If an INTERSECTION entry is read from a Shared file and is not in the current NODELIST, it is automatically appended to the end of the NODELIST. As with NODELIST above, this makes the Shared function effectively an automatic Merge function.

Duplicate nodes encountered in a NODELIST entry or an appended NODELIST are ignored.

The File-OpenShared menu item has been changed to File-OpenMerge/Shared to better indicate the fuction which this type of Open normally performs.

When a LinkTo function prompts the user to save changed data before the LinkTo is performed and a new path/file name is given, this path/file name is used by the LinkTo function. If no file has been provided, the LinkTo function performs properly with a linkage to the next rpogram, but without any data transfer.

:PRESYNCHRO Ver 1.00 02FEB03

Build 54 - 05JUN03

>Unnecessary Debug Trace Statements Removed.

Unnecessary debug trace statements were inadvertantly left in Build 52 and have been removed.

Build 52 - 04JUN03

>Export Volume Unadjusted by PHF.

In Build 50, volumes sent to SYNCHRO by the Export function were errantly adjusted by the peak hour factor entry, while the peak hour factor value was also exported, resulting in double-counting of the effect of peak hour factor. This error has been corrected.

>Import RTOR as 0 or 1 Instead of Using Satflow as RTOR Volume.

The RTOR value available in SYNCHRO UTDF files represents a value which is unique to SYNCHRO, termed SatFlowRTOR. In the past, this has been errantly imported as the RTOR value in PRESYNCHRO. Now, if SatFlowRTOR is non-zero, a 1 will be imported into PRESYNCHRO to indicate that RTOR is permitted, otherwise it will be set to zero to indicate RTOR is not allowed. When exporting RTOR to SYNCHRO, if a 0 is present in PRESYNCHRO a 0 will be exported, effectively preventing SYNCHRO from allowing RTOR. If the RTOR value in PRESYNCHRO is non-zero, no RTOR value will be exported, thus setting SYNCHRO in a mode which will allow its normal RTOR modeling. Note that a specific number of RTOR manuevers per hour cannot be specified to SYNCHRO. Note also that when reading the UTDF LANES file when 0 RTOR is allowed, the LANES file must be read twice to set this condition in SYNCHRO.

>Fix Export for Shared LT-TH with Protected Phasing.

Build 50 was not exporting the phasing correctly for a shared LT-TH lane when protected phasing was present. This situation has been corrected. A more generalized phasing algorithm has been implemented that will also provide more reliable phasing export, in general.

>Create Default Link Distance and Speed for External Approaches.

Under certain conditions, external links in a network which is exported to SYNCHRO received link distances and speeds of 0 which cxreated a problem when simulating with SIMTRAFFIC. These external links now receive a default link distance of 1320 feet and speed of 30 mph.

>Import Phasing and Timing for Permitted Stem of T-Intersection Correctly.

If the stem of a T-intersection was defined with a permitted phasing in SYNCHRO, certain conditions could prevent the proper import of the phasing and timing. This circumstacnce is now detected and imported correctly.

>Check for Metric Data and Abort with Message instead of Crash.

Import from and Export to SYNCHRO are only designed to work when SYNCHRO data is saved in U.S. Customary units, not metric. A check is now made to detect metric units in the files, producing a message to that effect rather than crashing.

>Convert ByPhase to ByMov Uses Reqclearances to Maintain Individual Y+AR.

The Convert button on the GREENTIMES and YELLOWTIMES dialogs has been modified so that when ByPhase timings are converted to ByMovement, the REQCLEARANCES values for each movement are used to define the ByMovement clearances rather than using the ByPhase phase clearances. This permits individual movements to maintain distinctly different clearance times, regardless of how many timnes the Convert button is used. To this end, entries of ByMovement clearance times in the YELLOWTIMES dialog are always transferred directly to the REQCLEARANCES dialog, and REQCLEARANCES entries are transferred directly to the YELLOWTIMES dialog if timings are ByMovement.

>More Accurate Import When Y+AR Differ.

Minor inconsistencies between PRESYNCHRO timings and SYNCHRO timings could exist when the Yellow+AllRed clearance times were different for movements that both terminated in the same phase. Using the method described previously, this inconsistency has been eliminated. A special case of this condition which always imported incorrectly was the clearance time for the last phase of a split-phase (SEQUENCE 8) operation. Also, Imported movement YELLOWTIMES are also entered as values of the REQCLEARNCES dialog.

>Import Removes Default ALL in SEQUENCE Spec List.

If a SEQUENCE entry includes the default 'ALL' or 'AA' entry in the list of allowed phasing, this entry is removed when a specific phasing and timing is imported for a full network Import. If the list is something other than 'ALL' or 'AA' it remains unchanged.

>Permitted Split Phase Now Detected on Import.

SYNCHRO allows a split phasing to be defined which shows the left turns as permitted instead of protected. As a result, PRESYNCHRO was not detecting the split phase operation since the lefts of split phase are assumed protected in TEAPAC. A special condition check has been added so that this definition of split phase is detected and imported properly.

>Message Warns of Possible Phasing Specification Error.

SYNCHRO allows phasing definitions that do nto necessarily correspond to those allowed by PRESYNCHRO and TEAPAC in general. If such a phasing is used in SYNCHRO, the imported results are somewhat unpredictable. One sign of this situation is when the imported phase timings do not add up to the cycle length for a signal in SYNCHRO. When this situation is detected, a new message to this effect is issued warning for close scrutiny of the imported phasing and timings. One case where this is known to be possible is when split-phasing is specified in SYNCHRO but the left turns are shwon as permitted instead of protected.

>Fixed Movement Entries on NETWORK for Diagonal Connections.

Under certain conditions in SYNCHRO networks with diagonal connections, the Movements values of NETWORK entries may not have been imported correctly. This could have an improper effect on subtle aspects of Export functions in PRETRANSYT and PRENETSIM if the imported data was passed to these programs, as well as in a VISSIM Import of this data. These connections are now Imported correctly.

>Improved Translation of Imported T-Intersection Conditions.

Under certain conditions at T-intersections, the movement data on the stem of the T may not have been placed in the correct TEAPAC movement position due to the need to adjust the lane configuration from the SYNCHRO coding to the TEAPAC coding. This could occur on 1-lane approaches and on approaches where all turn lanes go the same direction and only a single lane is shared for the other turn. This has been corrected, as well as making sure the Dual-Optional Grouptype is translated properly.

When the stem of the T-intersection is a diagonal leg defined in the MOVEMENTS.DAT file, it is important that the two movements are defined as TEAPAC turns, even if one of the movements appears much like a thru movement due to the diagonal approach angle.

>Dummy Nodes Are Ignored by TIMINGS Report.

Any intersection identified as a 'Dummy node' in the INTERSECTION description field will be omitted from the TIMINGS results, along with unsignalized intersections which are already omitted.

Build 50 - 08MAY03 (Initial Release)

>Initial Release of PRESYNCHRO Connects TEAPAC to SYNCHRO/SIMTRAFFIC.

PRESYNCHRO provides the first-ever connection between TEAPAC and the popular SYNCRHO/SIMTRAFFIC program.

SYNCHRO is a popular way of inputting data due to its intuitive input interface, as well as providing colorful on-screen displays of quick and easy performance assessments, optimizations and animations. When methods that are more time-proven, government-sponsored and validated are desired for assessment, optimization and animation using well-understood tools such as SIGNAL2000, TSPPD, PASSER, TRANSYT, CORSIM and VISSIM, PRESYNCHRO provides the interface to accomplish exactly that.

PRESYNCHRO can Import an entire SYNCHRO network from its UTDF files and share this information immediately with other TEAPAC programs such as SIGNAL2000, PRETSPPD, PREPASSR, PRETRANSYT and PRENETSIM, as well as with VISSIM through its built-in TEAPAC interface, thereby allowing the data inputs to SYNCHRO to be used by any or all of the programs mentioned above for more complete, proven and trusted results in terms of assessment, optimization and animation. Upon completion of the assessment, optimization or animation of the network by these other programs, PRESYNCRHO can export these results back to SYNCHRO for further viewing and/or as a final resting place for the optimized parameters.

In the event a network is originally defined within the TEAPAC umbrella of programs, an entire SYNCHRO network can be created from the TEAPAC data by a PRESYNCRHO Export so that SYNCHRO's assessment or animation tools can be utilized to represent the performance of the network. If SYNCHRO's casual optimization is of interest to the TEAPAC user, the optimized variables can be Imported back into PRESYNCHRO for comparison to those obtained by other techniques, either by visual comparison or analytical comparison using the time-tested tools described above.

TEAPAC and its related programs provide the following functions over-and-above those of SYNCHRO/SIMTRAFFIC. SIGNAL2000 provides for legitimate capacity analysis and signal optimization according to the strict methods of the Transportation Research Board's 2000 Highway Capacity Manual (HCM2000). PRETRANSYT/TRANSYT provides time-proven, FHWA-supported simulation and optimization of signal networks. PRENETSIM/CORSIM provides time-proven, FHWA-sponsored microscopic simulation and animation with NETSIM/CORSIM. PREPASSR/PASSER-II provides true bandwidth optimization with PASSER-II from TTI/TXDOT/FHWA. PRETSPPD/TSPPDRAFT provides legitimate time-space and platoon-progression diagrams following the TRANSYT flow model. Other programs which read TEAPAC data file formats provide additional functions, such as VISSIM for sophisticated and validated simulation and animation of signal networks.

As a result, PRESYNCHRO fully-integrates the visually attractive SYNCHRO/SIMTRAFFIC programs into the world of fundamentally sound traffic operations software.

I N D E X

This index provides an alphabetical list of keywords, commands and subjects covered in the *PRESYNCHRO Tutorial/Reference Manual*. This includes references made in both the Tutorial and Reference sections of the manual. Tutorial Manual references are indicated by page numbers alone, while Reference Manual locations are indicated by the Appendix letter preceding the page number of that appendix.

Entries in the index which are in all capital letters usually refer to specific commands of the program. They may also refer to keyword options or a program name. Entries in all capital letters enclosed in square brackets [XXX] refer to group/menu names representing specific menus or groups of commands. Entries enclosed in angle brackets <XXX> refer to specific data inputs associated with commands of the program. Entries preceded by an equal sign =XXX indicate a discussion of an output of the program, either a result of the computations or an input tabulation.

The primary discussions for commands are indicated by page locations in **bold print**, located in Appendix B of the Reference Manual.

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